Complete Monograph

2024 GROUP A PROPOSED CHANGES TO THE I-CODES

Committee Action Hearings (CAH #2)
October 23 - 31, 2024
Long Beach Convention Center
Long Beach, CA

ICC
INTERNATIONAL CODE COUNCIL®

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TABLE OF CONTENTS

PAGE

INTRODUCTION

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This Comment Hearing Agenda includes the Individual Consideration Agenda for comments to the code change proposals that comprise the 2024 Code Development Cycle.

The Individual Consideration Agenda is comprised of proposed changes*, which* received a comment in response to the Code Committee's action at the Committee Action Hearings #1.

Items on the Individual Consideration Agenda are published with information as originally published for the CAH #1 as well as the published hearing results. Following the hearing results is the reason that the item is on the Individual Consideration Agenda followed by the comments which were received.

Public testimony will follow the procedures given in *CP#28-05 Code Development* as published on page ix. Refer to the tentative hearing order on page xlii.

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With the implementation of the cdpACCESS online system, CP 28 was revised to reflect that floor modifications would be submitted electronically at the Committee Action Hearing #2 (CAH #2). The modifications in this hearing are specific to the comments submitted in response to the committee's action taken in CAH #1.

Those who are submitting a modification for consideration by the respective Code Development Committee are required to sign a Copyright Release in order to have their modification(s) considered (Section 4.3.5.5 of CP 28). This feature is built into cdpACCESS similar to the way the release is executed for the initial code change and public comment submittals.

Comments submitted in response to CAH #1 must be called to the floor during CAH#2 to be discussed and considered by the respective code development committee (CDC).

The Chair rules the modification in or out of order. Note that this is a procedural ruling to determine if the modification is to be permitted to be considered at the hearing. It is not a technical ruling. The ruling is final, with no challenge allowed.

The modification proponent is required to identify the specific text of the code change proposal that is being revised and the revision itself. In this way, it is very similar to the comment and public comment process and that is the way cdpACCESS was developed to process modifications.

Example:

Original code change proposal.
The original code change proposal requested the following change to Section 1506.2 of the IBC: (Note that the example is fictional.)

FS15-24-USER-MC1
803.1.1

Proponent: John West representing self

Revise as follows:

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.

Exception: Interior wall and ceiling finish materials qualified in accordance with Section 104.2.3 and approved by the code official.

Proposed modification:

A modification to the code change proposal is proposed:

1. To change “Interior wall and ceiling finish materials” to “Interior wall and ceiling finish systems.”
2. To remove “and approved by the code official” from the exception.

The cdpACCESS system will provide the text of the original code change proposal with the proposed change incorporated into the text. Using the cdpACCESS system, the proponent of the modification locates the original change in the system.

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IMPORTANT NOTE: ONCE A COMMENT IS BROUGHT TO THE FLOOR, ALL MODIFICATIONS MUST BE IN THE cdpACCESS SYSTEM. SEE NOTE 1.

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ICC COMMITTEE ACTION HEARING (CAH #2) PROCESS

The hearing process will follow CP #28. The process is summarized as follows and will occur for each code noted in the hearing order (CP #28 sections noted):

1. At the start of each of the individual hearings for the respective code (see page xlii):
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   be a motion and a second a comment is discussed. Once discussion is complete the committee chair calls for a vote of the committee. The committee will vote. A simple majority vote is needed for a successful vote. Following the completion of the vote and any necessary reason statements, the committee chair will call for any further motions. This step will repeat until no further motions of the committee are called on this code change.
5. Repeat 2 – 4 for subsequent code changes

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PROPONENT REVIEW OF COMMENTS

While great care has been exercised in the publication of this document, there may be errata posted for the Comment Agenda. **Proponents are encouraged to carefully review their comments and email errata to dbroadnax@iccsafe.org by September 19, 2024 to be included in our published errata to the Committee Action Hearing Agenda (CAH #2) in order to be included in the agenda for consideration at the Committee Action Hearings (CAH #2).** Errata, if any, identified prior to the Committee Action Hearings (CAH #2) will be posted as updates to the Committee Action Hearing (CAH #2) Agenda on the ICC website here.
Users are encouraged to periodically review the ICC Website for updates to the 2024 Committee Action Hearing (CAH #2) Agenda.

EDITORIAL CODE CHANGES - CODE CORRELATION COMMITTEE

In a typical code change cycle, there are code change proposals that are considered strictly editorial. Section 5.4 of CP 28 (see below) establishes a process by which the Code Correlation Committee (CCC) considers such proposals.

5.4 Editorial Code Change Proposals. When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate Committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate Committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the First Committee Action Hearing (CAH #1). Code Correlation Committee proposals that are not added to a Committee hearing agenda shall be published in the next edition of the code with no further consideration.

Since a comment, by extension, is part of a code change proposal, ICC has applied the purpose and intent of Section 5.4 to comments. There are no comments submitted for CAH #2 in the current 2024 Group A Cycle that have been considered editorial.

2024 Group A Codes/Code Development Committees:

- IBC-E: IBC Egress provisions. Chapters 10 and 11.
- IBC-FS: IBC Fire Safety provisions. Chapters 7, 8, 9 (partial), 14 and 26. Majority of IBC Chapter 9 is maintained by the IFC. See Code Group Notes.
- IFC: The majority of IFC Chapter 10 is maintained by IBC-E. See Code Group Notes.
- IFGC
- IMC
- IPC
- IPSDC: Code changes heard by the IPC committee (combined IPC & IPSDC committee)
- IRC-M: IRC Mechanical provisions. Chapters 12 – 23 (code changes heard by the IRC - MP committee)
- IRC-P: IRC Plumbing provisions. Chapters 25 – 33 (code changes heard by the IRC – MP committee)
- ISPSC
- IWUIC: Code changes heard by the IFC committee (combined IFC & IWUIC committee)

2025 Group B Codes/Code Development Committees:

- Admin: Chapter 1 of all the I-Codes except the IgCC and IRC. Also includes the update of currently referenced standards in all of the 2021 Codes, except the IgCC. See Code Group Notes below for the IECC and the ICC PC.
- IBC-G: IBC General provisions. Chapters 3 – 6, 12, 13, 27 – 33.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and IEBC structural provisions. See Code Group Notes.
- IEBC: IEBC Non-structural provisions. See Code Group Notes.
- IgCC: The administration provisions of Chapter 1 of the IgCC in order to provide for coordination with the other administrative provisions in the I-Codes. Additionally, Appendix M included as it is not included in ASHRAE Standard 189.1. Remainder of the code is based on the provisions of ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings*.
- IPMC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)
- IRC-B: IRC Building provisions. Chapters 1 – 10
- IZC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)

Code Group Notes:

- Be sure to review the document entitled “2024/2025/2026 Group A and B Code Development Committee Responsibilities Matrix” (matrix) which has been posted. This identifies responsibilities which are different than Group A and B codes and committees which may impact the applicable code change cycle and resulting code change deadline. As an example, throughout Chapter 4 of the IBC (IBC- General), there are numerous sections which include the designation “[F]” which indicates that the provisions of the section are maintained by the IFC committee. Similarly, there are numerous sections in the IEBC which include the designation “[BS]”. These are structural provisions which will be heard by the IBC – Structural committee. The designations in the code are identified in the matrix.
- I-Code Chapter 1: Proposed changes to the provisions in Chapter 1 of the majority of the I-Codes are heard in Group B (see Admin above for exceptions). Be sure to review the brackets ([ ]) of the applicable code.
- Definitions. Be sure to review the brackets ([ ]) in Chapter 2 of the applicable code and the matrix to determine which committee will consider proposed changes to the definitions.
- ICC Performance Code (ICC PC): The 2027 edition of the ICC PC will be updated utilizing the ICC standards process. Click link for more information.
- International Energy Conservation Code (IECC) and Chapter 11 of the International Residential Code (IRC): The 2027 edition of the IECC and Chapter 11 of the IRC will be updated utilizing the ICC standards process. Click link for more information.

2024/2025/2026 STAFF SECRETARIES

GROUP A (2024)

IBC – Egress Chapters 10, 11	IBC – Fire Safety Chapters 7, 8, 9, 14, 26	IFC	IFGC	IMC
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org
IPC/IPSDC	**IRC Mechanical**	**IRC Plumbing**	**ISPSC**	**IWUIC**
Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org

GROUP B (2025)

ADMINISTRATIVE Chapter 1 All Codes except the IECC, IgCC, and IRC	IBC – General Chapters -6, 12, 13, 27-34	IBC- Structural Chapters 15-25 IEBC Structural	IEBC	ICC Performance
Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Quinton Owens Sugar City, ID Ext 4319 qowens@iccsafe.org Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org
IgCC	**IPMC**	**IRC-Building**		**IZC**
Alex Smith alsmith@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpearlberg@iccsafe.org Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org		Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org

CP#28-05 – Code Development

Approved: 09/24/05 | **Revised:** 07/12/24

1.0 Introduction

1.1 Purpose of Council Policy: The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).

1.2 Objectives: The ICC Code Development Process has the following objectives:

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.

1.2.2 The open discussion of code change proposals by all parties desiring to participate.

1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation, implementation or enforcement of laws, ordinances, rules, or regulations relating to the public health, safety, and welfare and by honorary members.

1.2.4 The increased participation of all parties desiring to participate through an online submittal and voting process that includes opportunities for online collaboration.

1.3 Code Publication: The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.

1.3.1 Code Correlation: The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. A Group A and Group B Code Development Committee Responsibilities Matrix identifies which Code shall be the primary document, and therefore which Code Development Committee shall be responsible for maintenance of the Code text where a given subject matter or Code text could appear in more than one Code. The Matrix shall be administered by the Code Correlation Committee as approved by the ICC Board and posted prior to the code change proposal deadline. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 5.5.

1.4 Process Maintenance: The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which Codes are developed embodies core principles of the organization. One of those principles is that the final content of the Codes is determined by a vote of the governmental and honorary members in accordance with Sections 10.6 and 11. It is the policy of the ICC Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.

1.5 Secretariat: The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals, comments to Committee action and public comments shall be addressed to the Secretariat. The Secretariat shall have the authority to facilitate unforeseen situations which arise in the implementation of this council policy. Staff shall maintain a record of such actions.

Council, and ICC staff shall, by an appropriate method, publish approved ICAs and ensure that approved ICAs are distributed with future sales of affected codes. ICAs shall be distributed as a separate document and shall not be incorporated into the text of a published code until such time that the ICA has been approved by the full code development process, following submittal as a proposal in accordance with Section 2.3.2.11.

2.3.2.9 Appeals. A decision of the Codes and Standards Council to approve an ICA shall be appealable to the ICC Board in accordance with CP#1 – Appeals.

2.3.2.10 Applicability. ICAs shall not be considered retroactive requirements.

2.3.2.11 Subsequent Processing. An approved ICA shall automatically become a code change proposal from the Codes and Standards Council in the following code cycle.

2.4 Code Development Record. The code development record shall include the official documents and records developed in support of the given code development cycle. This includes the following:

1. Code Change Agenda (Section 5.8)
2. Audio and video recording of both Committee Action Hearings for each code group (Sections 6.1 and 8.1)
3. Report of both Committee Action Hearings for each code group (Sections 6.7 and 8.5)
4. Public Comment Agenda (Section 9.6)
5. Public Comment Hearing results (Section 10.5.9.10)
6. Audio and video recording of the Public Comment Hearing (Section 10.0)
7. The Online Governmental Consensus Ballot (Section 11.3)
8. Final Action results (Section 13.4)
9. Errata to the documents noted above

The information resulting from online collaboration between interested parties shall not be part of the code development record.

3.0 Restructured Process Starting in 2024 (New)

3.1 Process: The 2027 I-Codes, and future editions, shall be developed utilizing a restructured code development process starting in 2024. The process includes the following key process steps:

YEAR ONE

- Code Group A code change proposals due (see Section 4.0)
- Code Group A First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group A comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group A Second Committee Action Hearing (CAH #2) (see Section 8.0)

YEAR TWO

- Code Group B code change proposals due (see Section 4.0)
- Code Group A public comments due (see Section 9.0)
- Code Group B First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group B comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group B Second Committee Action Hearing (CAH # 2) (see Section 8.0)

YEAR THREE

- Code Group B public comments due (see Section 9.0)

- Combined Code Group A & B Public Comment Hearing (see Section 10.0)
- Combined Code Group A & B Online Governmental Consensus Vote (see Section 11.0)

3.2 Schedule: A schedule of Code Groups, dates, locations and process steps with deadlines shall be posted a minimum of 120 days prior to the code change submittal deadline for Code Group A codes.

4.0 Submittal of Code Change Proposals

4.1 Intent: Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.

4.2 Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to membership action on the consent agenda at the Public Comment Hearing or prior to testimony on the code change proposal on the individual consideration agenda at the Public Comment Hearing. All actions on the code change proposal shall cease immediately upon the withdrawal of the code change proposal.

4.3 Form and Content of Code Change Submittals: Each code change proposal shall be submitted separately and shall be complete in-itself. Each submittal shall contain the following information:

4.3.1 Proponent: Each code change proposal shall include the name, title and email address of the proponent. Email addresses shall be published with the code change proposals unless the proponent otherwise requests on the submittal form.

4.3.1.1 If a group, organization or Committee submits a code change proposal, an individual with prime responsibility shall be indicated.

4.3.1.2 If a proponent submits a code change proposal on behalf of a client, group, organization or Committee, the name and email address of the client, group, organization, or Committee shall be indicated.

4.3.2 Code Reference: Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.

4.3.2.1 If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.

4.3.2.2 If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.

4.3.3 Multiple Code Change Proposals to a Code Section. A proponent shall not submit multiple code change proposals to the same code section. Where a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 5.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

4.3.4 Text Presentation: The text of the code change proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

4.3.4.1 A charging statement shall indicate the referenced code section(s) and whether the code change proposal is intended to be an addition, deletion, or a revision to existing Code text.

4.3.4.2 Whenever practical, the existing wording of the text shall be preserved with

only such deletions and additions as necessary to accomplish the desired change.

4.3.4.3 Each code change proposal shall be in proper code format and terminology.

4.3.4.4 Each code change proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.

4.3.4.5 The proposed text shall be in mandatory terms.

4.3.5 Supporting Information: Each code change proposal shall include sufficient supporting information to indicate how the code change proposal is intended to affect the intent and application of the Code.

4.3.5.1 Purpose: The proponent shall clearly state the purpose of the code change proposal (e.g., clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.).

4.3.5.2 Reasons: The proponent shall justify changing the current Code provisions, stating why the code change proposal is superior to the current provisions of the Code. Code change proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such code change proposals will improve the Code.

4.3.5.3 Substantiation: The proponent shall substantiate the code change proposal based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 5.2 and determined as not germane to the technical issues addressed in the code change proposal may be identified as such. The proponent shall be notified that the code change proposal is considered an incomplete proposal in accordance with Section 5.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with CP#1 - Appeals. The burden of providing substantiating material lies with the proponent of the code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the reason statement. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

4.3.5.4 Bibliography: The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

4.3.5.5 Copyright Release: The proponent of code change proposals, floor modifications, comments to Committee action and public comments shall sign a copyright release developed and posted by ICC.

4.3.5.6 Cost Impact: The proponent of the code change proposal, floor modification, and comments shall provide a cost impact statement in accordance with Section 17.0.

in a standard manner by the Secretariat and be assigned separate, distinct, and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 4.3.2 to facilitate the hearing process.

5.8 Code Change Agenda: All code change proposals shall be posted on the ICC website at least 30 days prior to the First Committee Action Hearing (CAH #1) on those proposals and shall constitute the agenda for the hearing. Any errata to the Code Change Agenda shall be posted on the ICC website as soon as possible. Code change proposals which have not been published in the original posting or subsequent errata shall not be considered.

6.0 First Committee Action Hearing (CAH #1)

6.1 Intent: The intent of the First Committee Action Hearing (CAH #1) is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The Committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals.

6.2 Code Development Committee: The Codes and Standards Council shall review all applications and make Committee appointment recommendations to the ICC Board. The Committees shall be appointed by the ICC Board. (See Section 1.6 for terminology).

6.2.1 Chairperson/Moderator: The Chairperson and Vice-Chairperson shall be selected by the Codes and Standards Council from the appointed members of the Committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Committee Action Hearing.

6.2.2 Conflict of Interest: A Committee member shall withdraw from and take no part in those matters with which the Committee member has an undisclosed financial, business or property interest. The Committee member shall not participate in any Committee discussion, or any Committee vote on the matter in which they have an undisclosed interest. A Committee member who is a proponent of a code change proposal shall not participate in any Committee discussion on the matter or any Committee vote. Such Committee member shall be permitted to participate in the floor discussion in accordance with Section 6.5 and Section 8.4.1 by stepping down from the dais.

6.2.3 Representation of Interest: Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the Committee.

6.2.4 Committee Composition: The Committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the Committee members shall be Regulators (General Interest category in accordance with CP#7 – Committees and Members).

6.3 Date and Location: The date and location of the Committee Action Hearing shall be announced not less than 60 days prior to the date of the hearing.

6.4 General Procedures: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Committee Action Hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the Committee.

6.4.1 Chair Voting: The Chairperson of the Committee shall vote only when the vote cast will break a tie vote of the Committee.

6.4.2 Open Hearing: The Committee Action Hearing is an open hearing. Any interested

person may attend and participate in the floor discussion. Only Committee members may participate in the Committee action portion of the hearings (see Section 6.6). Participants shall not advocate a position on specific code change proposals with Committee members other than through the methods provided in this policy.

6.4.3 Presentation of Material at the Committee Action Hearing: Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 6.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 4.3.5.3 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the Committee at the public hearing.

6.4.4 Agenda Order: The Secretariat shall publish a Code Change Agenda for the Committee Action Hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the hearing, or at any time during the hearing except while another code change proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

6.4.4.1 Proponent Approval: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance in the hearing room and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to change the hearing order is not debatable.

6.4.4.2 Revised Agenda Order Approved: A motion to revise the agenda order is subject to a 2/3 vote of those present.

6.4.5 Tabling: Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or

2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

6.4.5.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

6.4.5.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 6.4.5 Items 1 or 2. The

testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

6.4.6 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on by the Committee in accordance with Section 6.6.

6.4.7 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person testifying on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall identify the time limits on debate at the beginning of the hearing. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

6.4.7.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

6.4.7.2 Proponent Testimony: The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.

6.4.8 Points of Order: Any person participating in the hearing may challenge a procedural ruling of the Moderator or the Chairperson. A majority vote of ICC Members in attendance shall determine the decision.

6.5 Floor Discussion: The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

6.5.1 Discussion Order:

1. Support. The Moderator shall begin by asking the proponent and then others in support of the code change proposal for their comments.
2. Opposition. After discussion by those in support of a code change proposal, those opposed hereto, if any, shall have the opportunity to present their views.
3. Rebuttal in support. Those in support shall then have the opportunity to rebut points raised by those in opposition.
4. Rebuttal in opposition. Those in opposition shall then have the opportunity to respond to the rebuttal in support.

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6.5.2 Modifications: Modifications to code change proposals may be suggested from the floor by any person participating in the hearing. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification.

6.5.2.1 Submission. All modifications shall be submitted electronically to the ICC Secretariat in a format determined by ICC unless determined by the Chairperson to be either editorial or minor in nature. The modification will be forwarded electronically to the members of the Committee during the hearing and will be projected on the screen in the hearing room.

6.5.2.2 Criteria. The Chairperson shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be

PROPONENT REVIEW OF COMMENTS

While great care has been exercised in the publication of this document, there may be errata posted for the Comment Agenda. **Proponents are encouraged to carefully review their comments and email errata to dbroadnax@iccsafe.org by September 19, 2024 to be included in our published errata to the Committee Action Hearing Agenda (CAH #2) in order to be included in the agenda for consideration at the Committee Action Hearings (CAH #2).** Errata, if any, identified prior to the Committee Action Hearings (CAH #2) will be posted as updates to the Committee Action Hearing (CAH #2) Agenda on the ICC website here.
Users are encouraged to periodically review the ICC Website for updates to the 2024 Committee Action Hearing (CAH #2) Agenda.

EDITORIAL CODE CHANGES - CODE CORRELATION COMMITTEE

In a typical code change cycle, there are code change proposals that are considered strictly editorial. Section 5.4 of CP 28 (see below) establishes a process by which the Code Correlation Committee (CCC) considers such proposals.

5.4 Editorial Code Change Proposals. When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate Committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate Committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the First Committee Action Hearing (CAH #1). Code Correlation Committee proposals that are not added to a Committee hearing agenda shall be published in the next edition of the code with no further consideration.

Since a comment, by extension, is part of a code change proposal, ICC has applied the purpose and intent of Section 5.4 to comments. There are no comments submitted for CAH #2 in the current 2024 Group A Cycle that have been considered editorial.

2024/2025/2026 ICC CODE DEVELOPMENT SCHEDULE

3/17/2 | Updated 3/5/24

STEP IN CODE DEVELOPMENT CYCLE	DATE		
	2024 – Group A Codes IBC – E, IBC – FS, IFC, IFGC, IMC, IPC, IPSDC, IRC – M, IRC – P, ISPSC, IWUIC	**2025 – Group B Codes Admin, IBC – G, IBC – S, IEBC, IgCC (Ch. 1 & App M), IPMC, IRC – B, IZC**	**2026 - Group A & B Codes Public Comments Posting, Public Comment Hearing, Online Governmental Consensus Vote**
DEADLINE FOR RECEIPT OF ONLINE APPLICATIONS FOR ALL CODE DEVELOPMENT COMMITTEES	June 1, 2023 (See Schedule Notes)		
cdpACCESS OPEN FOR CODE CHANGE SUBMITTALS	October 16, 2023 (Tentative)	October 15, 2024	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF CODE CHANGE PROPOSALS	January 8, 2024	January 10, 2025	
WEB POSTING OF "PROPOSED CHANGES TO THE I-CODES" (Monograph)	February 26, 2024	March 13, 2025	
COMMITTEE ACTION HEARING #1 (CAH #1)	April 7 – 16, 2024	April 27 – May 6, 2025	
cdpACCESS OPEN FOR COMMENT SUBMITTALS TO CAH #1 ACTION	May 16, 2024	June 3, 2025	
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING #1"	May 16, 2024	June 3, 2025	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF COMMENTS ON CAH #1 ACTIONS	July 8, 2024	July 15, 2025	
WEB POSTING OF "COMMENTS TO CAH #1"	September 5, 2024	September 10, 2025	
COMMITTEE ACTION HEARING #2 (CAH #2)	October 23 – 31, 2024	October 22 - 30, 2025	
WEB POSTING OF "REPORT OF THE COMMITTEE ACTION HEARING #2"	December 2, 2024	November 25, 2025	

STEP IN CODE DEVELOPMENT CYCLE	DATE		
	2024 – Group A Codes IBC – E, IBC – FS, IFC, IFGC, IMC, IPC, IPSDC, IRC – M, IRC – P, ISPSC, IWUIC	**2025 – Group B Codes Admin, IBC – G, IBC – S, IEBC, IgCC (Ch. 1 & App M), IPMC, IRC – B, IZC**	**2026 - Group A & B Codes Public Comments Posting, Public Comment Hearing, Online Governmental Consensus Vote**
cdpACCESS OPEN FOR PUBLIC COMMENT SUBMITTALS FOR 2026 PCH	January 20, 2025 (Tentative)	November 25, 2025 (Tentative)	
DEADLINE FOR cdpACCESS ONLINE RECEIPT OF PUBLIC COMMENTS FOR 2026 PCH	March 14, 2025	January 5, 2026	
WEB POSTING OF "GROUP A & B PUBLIC COMMENT AGENDA"	See 2026	See 2026	March 4, 2026
COMBINED GROUP A & B PUBLIC COMMENT HEARING (PCH)	Combined Group A & B PCH in 2026	Combined Group A & B PCH in 2026	April 19 - 28, 2026
COMBINED GROUP A & B ONLINE GOVERNMENTAL CONSENSUS VOTING (OGCV) PERIOD	Combined Group A & B OGCV in 2026	Combined Group A & B OGCV in 2026	Starts approx. two - three weeks after the last day of PCH.
WEB POSTING OF GROUP A & B FINAL ACTION	See 2026	See 2026	Following Validation Committee certification and ICC Board confirmation.

Schedule Notes:

- This schedule introduces the restructured process starting in 2024 with two Committee Action Hearings (CAH #1 and CAH #2) for each Code Group in 2024 and 2025, followed by a combined Group A and B PCH and OGCV in 2026. Click here for more information.
- Code Development Committee applications: As noted above, the restructured process will include two CAH's for which the same committee members who presided at CAH #1 will also preside at CAH #2. Previous cycles required Code Development Committee members to preside at only a single CAH in the Spring of the given year. Please be sure to consider this when applying for a Code Development Committee position.
- The "cdpACCESS OPEN" steps noted as "(tentative)" reflect availability of the applicable codes in the cdpACCESS system.
- Web posting of the "Proposed Changes to the I-Codes", "Comments to CAH #1" and "Group A & B Public Comment Agenda" will be posted no later than scheduled. ICC will make every effort to post these documents earlier, subject to code change/comment/public comment volume and processing time.
- "Comment" vs "Public Comment": CP28 uses the term "comment" to indicate a submittal in response to CAH #1 action and "public comment" in response to a CAH #2 action to be considered at the PCH. See Sections 7.0 and 9.0 om CP28.

2024 Group A Codes/Code Development Committees:

- IBC-E: IBC Egress provisions. Chapters 10 and 11.
- IBC-FS: IBC Fire Safety provisions. Chapters 7, 8, 9 (partial), 14 and 26. Majority of IBC Chapter 9 is maintained by the IFC. See Code Group Notes.
- IFC: The majority of IFC Chapter 10 is maintained by IBC-E. See Code Group Notes.
- IFGC
- IMC
- IPC
- IPSDC: Code changes heard by the IPC committee (combined IPC & IPSDC committee)
- IRC-M: IRC Mechanical provisions. Chapters 12 – 23 (code changes heard by the IRC - MP committee)
- IRC-P: IRC Plumbing provisions. Chapters 25 – 33 (code changes heard by the IRC – MP committee)
- ISPSC
- IWUIC: Code changes heard by the IFC committee (combined IFC & IWUIC committee)

2025 Group B Codes/Code Development Committees:

- Admin: Chapter 1 of all the I-Codes except the IgCC and IRC. Also includes the update of currently referenced standards in all of the 2021 Codes, except the IgCC. See Code Group Notes below for the IECC and the ICC PC.
- IBC-G: IBC General provisions. Chapters 3 – 6, 12, 13, 27 – 33.
- IBC-S: IBC Structural provisions. IBC Chapters 15 – 25 and IEBC structural provisions. See Code Group Notes.
- IEBC: IEBC Non-structural provisions. See Code Group Notes.
- IgCC: The administration provisions of Chapter 1 of the IgCC in order to provide for coordination with the other administrative provisions in the I-Codes. Additionally, Appendix M included as it is not included in ASHRAE Standard 189.1. Remainder of the code is based on the provisions of ASHRAE Standard 189.1 *Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings*.
- IPMC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)
- IRC-B: IRC Building provisions. Chapters 1 – 10
- IZC: Code changes heard by the IPM/ZC (combined IPMC & IZC code committee)

Code Group Notes:

- Be sure to review the document entitled “2024/2025/2026 Group A and B Code Development Committee Responsibilities Matrix” (matrix) which has been posted. This identifies responsibilities which are different than Group A and B codes and committees which may impact the applicable code change cycle and resulting code change deadline. As an example, throughout Chapter 4 of the IBC (IBC- General), there are numerous sections which include the designation “[F]” which indicates that the provisions of the section are maintained by the IFC committee. Similarly, there are numerous sections in the IEBC which include the designation “[BS]”. These are structural provisions which will be heard by the IBC – Structural committee. The designations in the code are identified in the matrix.
- I-Code Chapter 1: Proposed changes to the provisions in Chapter 1 of the majority of the I-Codes are heard in Group B (see Admin above for exceptions). Be sure to review the brackets ([ ]) of the applicable code.
- Definitions. Be sure to review the brackets ([ ]) in Chapter 2 of the applicable code and the matrix to determine which committee will consider proposed changes to the definitions.
- ICC Performance Code (ICC PC): The 2027 edition of the ICC PC will be updated utilizing the ICC standards process. Click link for more information.
- International Energy Conservation Code (IECC) and Chapter 11 of the International Residential Code (IRC): The 2027 edition of the IECC and Chapter 11 of the IRC will be updated utilizing the ICC standards process. Click link for more information.

2024/2025/2026 STAFF SECRETARIES

GROUP A (2024)

IBC – Egress Chapters 10, 11	IBC – Fire Safety Chapters 7, 8, 9, 14, 26	IFC	IFGC	IMC
Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org
IPC/IPSDC	**IRC Mechanical**	**IRC Plumbing**	**ISPSC**	**IWUIC**
Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	LaToya Carraway Chicago Regional Office Ext 4347 lcarraway@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Fred Grable Chicago Regional Office Ext 4359 fgrable@iccsafe.org	Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org

GROUP B (2025)

ADMINISTRATIVE Chapter 1 All Codes except the IECC, IgCC, and IRC	IBC – General Chapters -6, 12, 13, 27-34	IBC-Structural Chapters 15-25 IEBC Structural	IEBC	ICC Performance
Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Quinton Owens Sugar City, ID Ext 4319 qowens@iccsafe.org Kim Paarlberg Indianapolis, IN Ext 4306 kpaarlberg@iccsafe.org	Dane Rankin Chicago Regional Office Ext 4405 drankin@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org Keith Enstrom Chicago Regional Office Ext 4342 kenstrom@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org
IgCC	**IPMC**	**IRC-Building**		**IZC**
Alex Smith alsmith@iccsafe.org	Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org	Kim Paarlberg Indianapolis, IN Ext 4306 kpearlberg@iccsafe.org Samhar Hoz Chicago Regional Office Ext 4284 shoz@iccsafe.org		Beth Tubbs Northbridge, MA Ext 7708 btubbs@iccsafe.org

CP#28-05 – Code Development

Approved: 09/24/05 | **Revised:** 07/12/24

1.0 Introduction

1.1 Purpose of Council Policy: The purpose of this Council Policy is to prescribe the Rules of Procedure utilized in the continued development and maintenance of the International Codes (Codes).

1.2 Objectives: The ICC Code Development Process has the following objectives:

1.2.1 The timely evaluation and recognition of technological developments pertaining to construction regulations.

1.2.2 The open discussion of code change proposals by all parties desiring to participate.

1.2.3 The final determination of Code text by public officials actively engaged in the administration, formulation, implementation or enforcement of laws, ordinances, rules, or regulations relating to the public health, safety, and welfare and by honorary members.

1.2.4 The increased participation of all parties desiring to participate through an online submittal and voting process that includes opportunities for online collaboration.

1.3 Code Publication: The ICC Board of Directors (ICC Board) shall determine the title and the general purpose and scope of each Code published by the ICC.

1.3.1 Code Correlation: The provisions of all Codes shall be consistent with one another so that conflicts between the Codes do not occur. A Group A and Group B Code Development Committee Responsibilities Matrix identifies which Code shall be the primary document, and therefore which Code Development Committee shall be responsible for maintenance of the Code text where a given subject matter or Code text could appear in more than one Code. The Matrix shall be administered by the Code Correlation Committee as approved by the ICC Board and posted prior to the code change proposal deadline. Duplication of content or text between Codes shall be limited to the minimum extent necessary for practical usability of the Codes, as determined in accordance with Section 5.5.

1.4 Process Maintenance: The review and maintenance of the Code Development Process and these Rules of Procedure shall be by the ICC Board. The manner in which Codes are developed embodies core principles of the organization. One of those principles is that the final content of the Codes is determined by a vote of the governmental and honorary members in accordance with Sections 10.6 and 11. It is the policy of the ICC Board that there shall be no change to this principle without the affirmation of two-thirds of the governmental and honorary members responding.

1.5 Secretariat: The Chief Executive Officer shall assign a Secretariat for each of the Codes. All correspondence relating to code change proposals, comments to Committee action and public comments shall be addressed to the Secretariat. The Secretariat shall have the authority to facilitate unforeseen situations which arise in the implementation of this council policy. Staff shall maintain a record of such actions.

1.6 Code Development Committee: The members of the respective Code Development Committee presiding over the hearings are appointed by the ICC Board in accordance with Section 6.2. The term "Committee" is used throughout this Council Policy to refer to Code Development Committee members.

1.7 Recording: Individuals requesting permission to record any meeting or hearing, or portion thereof, shall be required to provide the ICC with a release of responsibility disclaimer and shall acknowledge that ICC shall retain sole ownership of the recording, and that they have insurance coverage for liability and misuse of recording materials. Equipment and the process used to record shall, in the judgment of the ICC Secretariat, be conducted in a manner that is not disruptive to the meeting. The ICC shall not be responsible for equipment, personnel or any other provision necessary to accomplish the recording. An unedited copy of the recording shall be forwarded to ICC within 30 days of the meeting. Recordings shall not otherwise be copied, reproduced or distributed in any manner. Recordings shall be returned to ICC or destroyed upon the request of ICC.

1.8 Code of Ethics: Each individual participating in the ICC Code Development Process shall comply with the posted *ICC Code of Ethics.*

2.0 Code Development Cycle

2.1 Intent: The code development cycle shall consist of the complete consideration of code change proposals in accordance with the procedures herein specified, commencing with the deadline for submission of code change proposals (see Section 4.5) and ending with publication of the Final Action on the code change proposals (see Section 13.4).

2.2 New Editions: The ICC Board shall determine the schedule for publishing new editions of the Codes. Each new edition shall incorporate the results of the code development activity since the previous edition.

2.3 Interim Code Amendments: All revisions to the International Codes shall be processed in accordance with other sections of this Council Policy except for Emergency Actions by the ICC Board complying with Section 2.3.1 and Interim Critical Amendments (ICA) complying with Section 2.3.2.

2.3.1 Emergency Actions by the ICC Board: Emergency actions by the ICC Board are limited to those issues representing an immediate threat to health and safety that warrant a more timely response than allowed by the Code Development Process schedule.

2.3.1.1 Initial Request: A request for an emergency action shall be based upon perceived immediate threats to health and safety and shall be reviewed by the Codes and Standards Council for referral to the ICC Board for action with their analysis and recommendation.

2.3.1.2 Board and Member Action: In the event that the ICC Board determines that an emergency amendment to any Code or supplement thereto is warranted, the same may be adopted by the ICC Board. Such action shall require an affirmative vote of at least two-thirds of the ICC Board.

The ICC membership shall be notified within ten days after the ICC Boards' official action of any emergency amendment. At the next Annual Business Meeting, any emergency amendment shall be presented to the members for ratification by a majority of the Governmental Member Voting Representatives and Honorary Members present and voting.

All code revisions pursuant to these emergency procedures and the reasons for such corrective action shall be published as soon as practicable after ICC Board action. Such revisions shall be identified as an emergency amendment.

Emergency amendments to any Code shall not be considered as a retro-active requirement to the Code. Incorporation of the emergency amendment into the adopted Code shall be subjected to the process established by the adopting authority.

2.3.2 Interim Critical Amendments (ICA)

2.3.2.1 Submittal. Anyone may propose an ICA by providing the following information:

a) Name of submitter
b) Contact information
c) Submitters representation
d) Date
e) Relevant section(s) and code edition(s) under consideration
f) Proposed modifications with text changes identified using underlines for new text and strikethroughs for deleted text
g) A statement that substantiates the need for proposed changes and why the proposed submission is of such a critical nature in accordance with Section 2.3.2.3 that it cannot be left to be addressed during the next code development cycle.
h) Written endorsement of the proposed ICA by not less than two members of the Committee(s) responsible for maintaining the affected code section(s)

2.3.2.2 Preliminary Review. An ICA will only be processed if the Codes and Standards Council determines that the proposed ICA appears to be of a critical nature requiring prompt action based on the criteria specified in Section 2.3.2.3. If processed, the question of critical nature shall be further considered by the responsible Committee(s) and the Codes and Standards Council. The text of a proposed ICA shall be processed as submitted or shall be changed with the approval of the submitter. The Codes and Standards Council shall process their preliminary “critical nature” determination within 45 days of the ICA submission.

2.3.2.3 Determination of Critical Nature. Qualification for critical nature shall be based on one or more of the following factors:

a) The proposed ICA corrects an error or an omission that was overlooked during a regular code development process.
b) The proposed ICA resolves a conflict within an individual code or a conflict involving two or more ICC codes.
c) The proposed ICA mitigates a previously unknown hazard.

2.3.2.4 Committee. A proposed ICA that meets the provisions in Sections 2.3.2.2 and 2.3.2.3 shall be submitted to the Committee(s) responsible for the affected section(s) for a ballot and comment period of 30 calendar days. The Committee(s) shall be separately balloted on both the technical merit of the ICA and whether the ICA satisfies the critical nature criteria. Negative votes in the initial ballot, if any, shall require a reason statement and shall be circulated to the full Committee(s) to allow initial ballot votes to be changed.

A Committee recommendation for approval shall require an affirmative vote of at

least three-fourths of members who voted, on both technical merit and critical nature. The following shall be omitted from the three-fourths vote calculation:

a) Committee members who have abstained.
b) Committee members whose negative ballots do not include a statement conveying the reason for casting a negative vote.
c) Committee members who do not return their ballots prior to the announced ballot return deadline.

In addition to the three-fourths majority described above, the number of affirmative votes shall be not less than 50% of all Committee members who are eligible to vote. Committee members eligible to vote shall be the total number of individuals who are members of the Committee on the date of ballot distribution and shall not be adjusted based on abstentions or ballots that were not returned.

ICAs that achieve the required number of affirmative votes on both technical merit and critical nature are approved for further processing in accordance with Sections 2.3.2.5 through 2.3.2.9. ICAs that do not achieve the required number of affirmative votes on both technical merit and critical nature are rejected.

2.3.2.5 Publication of Proposed ICA for Comment. An ICA that is approved in accordance with Section 2.3.2.3 shall be published by ICC in appropriate media with a notice inviting the public to comment on the proposed ICA. The comment period shall be open for at least 30 calendar days from the date of posting of the notice. When a proposed ICA revises text that was changed in the most recent code development cycle, the ICA comment notice shall also be directly provided to submitters of proposals, comments to Committee action and public comments to the affected section in the most recent code development cycle.

2.3.2.6 Additional Committee Review. All comments shall be circulated to the responsible Committee(s) for a 30-calendar day ballot and comment period allowing an opportunity for Committee members to change votes taken prior to the comment period. If any votes are changed to negative, negative votes shall be circulated to the full Committee, followed by a final ballot following the voting procedures Section 2.3.2.4.

Approved ICAs shall be forwarded to the Codes and Standards Council with a staff report that includes all comments, ballots, Committee member comments on ballots and concurrence by staff on which code editions should be affected by the ICA.

2.3.2.7 Action of the Codes and Standards Council. The Codes and Standards Council shall review the material submitted in accordance with Section 2.3.2.6 at the next Codes and Standards Council meeting. Approval of an ICA shall require an affirmative vote of at least two-thirds of the Codes and Standards Council members who cast a vote at the meeting.

2.3.2.8 Effective Date and Publication. ICAs that are approved by the Codes and Standards Council shall become effective 30 calendar days after approval, or in the case of an appeal in accordance with Section 2.3.2.9, 30 calendar days after a decision by the ICC Board upholding a Codes and Standards Council decision to issue an ICA.

An ICA shall apply to code editions specified by the ICC Codes and Standards

Council, and ICC staff shall, by an appropriate method, publish approved ICAs and ensure that approved ICAs are distributed with future sales of affected codes. ICAs shall be distributed as a separate document and shall not be incorporated into the text of a published code until such time that the ICA has been approved by the full code development process, following submittal as a proposal in accordance with Section 2.3.2.11.

2.3.2.9 Appeals. A decision of the Codes and Standards Council to approve an ICA shall be appealable to the ICC Board in accordance with CP#1 – Appeals.

2.3.2.10 Applicability. ICAs shall not be considered retroactive requirements.

2.3.2.11 Subsequent Processing. An approved ICA shall automatically become a code change proposal from the Codes and Standards Council in the following code cycle.

2.4 Code Development Record. The code development record shall include the official documents and records developed in support of the given code development cycle. This includes the following:

1. Code Change Agenda (Section 5.8)
2. Audio and video recording of both Committee Action Hearings for each code group (Sections 6.1 and 8.1)
3. Report of both Committee Action Hearings for each code group (Sections 6.7 and 8.5)
4. Public Comment Agenda (Section 9.6)
5. Public Comment Hearing results (Section 10.5.9.10)
6. Audio and video recording of the Public Comment Hearing (Section 10.0)
7. The Online Governmental Consensus Ballot (Section 11.3)
8. Final Action results (Section 13.4)
9. Errata to the documents noted above

The information resulting from online collaboration between interested parties shall not be part of the code development record.

3.0 Restructured Process Starting in 2024 (New)

3.1 Process: The 2027 I-Codes, and future editions, shall be developed utilizing a restructured code development process starting in 2024. The process includes the following key process steps:

YEAR ONE

- Code Group A code change proposals due (see Section 4.0)
- Code Group A First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group A comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group A Second Committee Action Hearing (CAH #2) (see Section 8.0)

YEAR TWO

- Code Group B code change proposals due (see Section 4.0)
- Code Group A public comments due (see Section 9.0)
- Code Group B First Committee Action Hearing (CAH #1) (see Section 6.0)
- Code Group B comments due on the action taken at CAH #1 (see Section 7.0)
- Code Group B Second Committee Action Hearing (CAH # 2) (see Section 8.0)

YEAR THREE

- Code Group B public comments due (see Section 9.0)

- Combined Code Group A & B Public Comment Hearing (see Section 10.0)
- Combined Code Group A & B Online Governmental Consensus Vote (see Section 11.0)

3.2 Schedule: A schedule of Code Groups, dates, locations and process steps with deadlines shall be posted a minimum of 120 days prior to the code change submittal deadline for Code Group A codes.

4.0 Submittal of Code Change Proposals

4.1 Intent: Any interested person, persons or group may submit a code change proposal which will be duly considered when in conformance to these Rules of Procedure.

4.2 Withdrawal of Proposal: A code change proposal may be withdrawn by the proponent (WP) at any time prior to membership action on the consent agenda at the Public Comment Hearing or prior to testimony on the code change proposal on the individual consideration agenda at the Public Comment Hearing. All actions on the code change proposal shall cease immediately upon the withdrawal of the code change proposal.

4.3 Form and Content of Code Change Submittals: Each code change proposal shall be submitted separately and shall be complete in-itself. Each submittal shall contain the following information:

4.3.1 Proponent: Each code change proposal shall include the name, title and email address of the proponent. Email addresses shall be published with the code change proposals unless the proponent otherwise requests on the submittal form.

4.3.1.1 If a group, organization or Committee submits a code change proposal, an individual with prime responsibility shall be indicated.

4.3.1.2 If a proponent submits a code change proposal on behalf of a client, group, organization or Committee, the name and email address of the client, group, organization, or Committee shall be indicated.

4.3.2 Code Reference: Each code change proposal shall relate to the applicable code sections(s) in the latest edition of the Code.

4.3.2.1 If more than one section in the Code is affected by a code change proposal, appropriate proposals shall be included for all such affected sections.

4.3.2.2 If more than one Code is affected by a code change proposal, appropriate proposals shall be included for all such affected Codes and appropriate cross referencing shall be included in the supporting information.

4.3.3 Multiple Code Change Proposals to a Code Section. A proponent shall not submit multiple code change proposals to the same code section. Where a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and processed in accordance with Section 5.3. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

4.3.4 Text Presentation: The text of the code change proposal shall be presented in the specific wording desired with deletions shown struck out with a single line and additions shown underlined with a single line.

4.3.4.1 A charging statement shall indicate the referenced code section(s) and whether the code change proposal is intended to be an addition, deletion, or a revision to existing Code text.

4.3.4.2 Whenever practical, the existing wording of the text shall be preserved with

only such deletions and additions as necessary to accomplish the desired change.

4.3.4.3 Each code change proposal shall be in proper code format and terminology.

4.3.4.4 Each code change proposal shall be complete and specific in the text to eliminate unnecessary confusion or misinterpretation.

4.3.4.5 The proposed text shall be in mandatory terms.

4.3.5 Supporting Information: Each code change proposal shall include sufficient supporting information to indicate how the code change proposal is intended to affect the intent and application of the Code.

4.3.5.1 Purpose: The proponent shall clearly state the purpose of the code change proposal (e.g., clarify the Code; revise outdated material; substitute new or revised material for current provisions of the Code; add new requirements to the Code; delete current requirements, etc.).

4.3.5.2 Reasons: The proponent shall justify changing the current Code provisions, stating why the code change proposal is superior to the current provisions of the Code. Code change proposals which add or delete requirements shall be supported by a logical explanation which clearly shows why the current Code provisions are inadequate or overly restrictive, specifies the shortcomings of the current Code provisions and explains how such code change proposals will improve the Code.

4.3.5.3 Substantiation: The proponent shall substantiate the code change proposal based on technical information and substantiation. Substantiation provided which is reviewed in accordance with Section 5.2 and determined as not germane to the technical issues addressed in the code change proposal may be identified as such. The proponent shall be notified that the code change proposal is considered an incomplete proposal in accordance with Section 5.3 and the proposal shall be held until the deficiencies are corrected. The proponent shall have the right to appeal this action in accordance with CP#1 - Appeals. The burden of providing substantiating material lies with the proponent of the code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the reason statement. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

4.3.5.4 Bibliography: The proponent shall submit a bibliography of any substantiating material submitted with the code change proposal. The bibliography shall be published with the code change proposal and the proponent shall make the substantiating materials available for review at the appropriate ICC office and during the public hearing. Supporting documentation may be provided via a link to a website provided by the proponent and included in the bibliography. The reason statement shall include the date the link was created.

4.3.5.5 Copyright Release: The proponent of code change proposals, floor modifications, comments to Committee action and public comments shall sign a copyright release developed and posted by ICC.

4.3.5.6 Cost Impact: The proponent of the code change proposal, floor modification, and comments shall provide a cost impact statement in accordance with Section 17.0.

4.4 Online Submittal: Each code change proposal and all substantiating information shall be submitted online via cdpACCESS. One copy of each proposed new referenced standard in electronic form shall be submitted to staff. Additional electronic copies may be requested when determined necessary by the Secretariat to allow such information to be distributed to the Committee. Where such additional copies are requested, it shall be the responsibility of the proponent to secure permission to post the proposed new reference standard on a secure ICC website for Committee viewing. In lieu of electronic copies, hard copies are acceptable.

4.5 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the code change deadline. Each code change proposal shall be submitted online via cdpACCESS by the posted deadline. The submitter of a code change proposal is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

4.6 Referenced Standards: In order for a standard to be considered for reference or to continue to be referenced by the Codes, a standard shall meet the following criteria:

4.6.1 Code References:

4.6.1.1 The standard, including title and date, and the manner in which it is to be utilized shall be specifically referenced in the Code text.

4.6.1.2 The need for the standard to be referenced shall be established.

4.6.2 Standard Content:

4.6.2.1 A standard or portions of a standard intended to be enforced shall be written in mandatory language.

4.6.2.2 The standard shall be appropriate for the subject covered.

4.6.2.3 All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.

4.6.2.4 The scope or application of a standard shall be clearly described.

4.6.2.5 The standard shall not have the effect of requiring proprietary materials.

4.6.2.6 The standard shall not prescribe a proprietary agency for quality control or testing.

4.6.2.7 The test standard shall describe, in detail, preparation of the test sample, sample selection or both.

4.6.2.8 The test standard shall prescribe the reporting format for the test results. The format shall identify the key performance criteria for the element(s) tested.

4.6.2.9 The measure of performance for which the test is conducted shall be clearly defined in either the test standard or in Code text.

4.6.2.10 The standard shall not state that its provisions shall govern whenever the referenced standard is in conflict with the requirements of the referencing Code.

4.6.2.11 The preface to the standard shall announce that the standard is promulgated according to a consensus procedure.

4.6.3 New and Updated Standards with Text Revisions:

4.6.3.1 Code change proposals with corresponding changes to the Code text which include a reference to a proposed new standard, or a proposed update of an existing referenced standard shall comply with this section.

4.6.3.1.1 Proposed New Standards. In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 4.4. If the proposed new standard is not submitted in at least consensus draft form, the code

change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the First Committee Action Hearing (CAH #1) by the applicable Committee responsible for the corresponding proposed changes to the code text.

If the Committee action at the Second Committee Action Hearing (CAH #2) is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. If the Committee action at the Second Committee Action Hearing (CAH #2) is Disapproval, further consideration on the Public Comment Agenda shall state that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing. See Section 10.5.6.1 for availability of new standards at the Public Comment Hearing.

4.6.3.1.2 Update of Existing Standards. Code change proposals which include technical revisions to the Code text to coordinate with a proposed update of an existing referenced standard shall include the submission of the proposed update to the standard in at least a consensus draft form in accordance with Section 4.4. If the proposed update of the existing standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal, including the update of the existing referenced standard, shall be considered at the First Committee Action Hearing (CAH #1) by the applicable Committee responsible for the corresponding changes to the code text.

If the Committee action at the Second Committee Action Hearing (CAH #2) is either As Submitted or As Modified and the updated standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. If the Committee action at the Second Committee Action Hearing (CAH #2) is Disapproval, further consideration on the Public Comment Agenda shall state that in order for the public comment to be considered, the updated standard shall be completed and readily available prior to the Public Comment Hearing. See Section 10.5.6.1 for availability of updated standards at the Public Comment Hearing.

Updating of standards without corresponding code text changes shall be accomplished administratively in accordance with Section 5.6.

4.6.4 Standard Promulgation: The standard shall be developed and maintained through a consensus process such as ASTM or ANSI.

5.0 Processing of Code Change Proposals

5.1 Intent: The processing of code change proposals is intended to ensure that each proposal complies with these Rules of Procedure and that the resulting published code change proposal accurately reflects that proponent's intent.

5.2 Review: Upon receipt in the Secretariat's office, the code change proposals will be checked for compliance with these Rules of Procedure as to division, separation, form, language, terminology, supporting statements and substantiating data. Where a code change proposal consists of multiple

parts which fall under the maintenance responsibilities of different Committees, the Secretariat shall determine the Committee responsible for determining the Committee action in accordance with Section 6.6 and the Group A and Group B Code Development Committee Responsibilities Matrix (see Section 1.3.1).

5.3 Incomplete Code Change Proposals: When a code change proposal is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the Secretariat shall notify the proponent of the specific deficiencies and the proposal shall be held until the deficiencies are corrected, with a final date set for receipt of a corrected submittal. If the Secretariat receives the corrected code change proposal after the final date, the proposal shall be held over until the next code development cycle. Where there are otherwise no deficiencies addressed by this section, a code change proposal that incorporates a new referenced standard shall be processed with an analysis of the referenced standard's compliance with the criteria set forth in Section 4.6.

5.4 Editorial Code Change Proposals. When a code change proposal is submitted that proposes an editorial or format change that, in the opinion of the Secretariat, does not affect the scope or application of the code, the proposal shall be submitted to the Code Correlation Committee who shall deem the code change proposal as editorial or send the proposal back to the Secretariat to be considered by the appropriate Committee. To be deemed editorial, such proposal shall require a majority vote of the Code Correlation Committee. Editorial proposals shall be published in the Code Change Agenda. Such proposals shall be added to the hearing agenda for consideration by the appropriate Committee upon written request to ICC by any individual. The deadline to submit such requests shall be 14 days prior to the first day of the First Committee Action Hearing (CAH #1). Code Correlation Committee proposals that are not added to a Committee hearing agenda shall be published in the next edition of the code with no further consideration.

5.5 Copy Editing Code Text: The Chief Executive Officer shall have the authority at all times to make editorial style and format changes to the Code text, or any approved changes, consistent with the intent, provisions and style of the Code. Such editorial style or format changes shall not affect the scope or application of the Code requirements.

5.6 Updating Standards Referenced in the Codes: Standards referenced by the Codes that do not require coordination with a code change proposal to the Code text shall be identified administratively by staff and considered by the Administrative Committee in accordance with these full procedures except that the deadline for availability of the updated standard and receipt by the Secretariat shall be December 1 of the third year of each code cycle. The published version of the new edition of the Code which references the standard will refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued. Multiple standards to be updated may be included in a single proposal.

5.6.1 Updating ICC Standards Referenced in the Codes. All standards developed by ICC and referenced by the Codes which are undergoing an update shall be announced by ICC to allow stakeholders to participate in the update process. Where the updated standard is completed and available by December 1 of the third year of the code cycle, the published version of the new edition of the Code which references the standard shall refer to the updated edition of the standard. If the standard is not available by the December 1st deadline, the edition of the standard as referenced by the newly published Code shall revert back to the reference contained in the previous edition and an errata to the Code issued.

5.7 Preparation: All code change proposals in compliance with these procedures shall be prepared

in a standard manner by the Secretariat and be assigned separate, distinct, and consecutive numbers. The Secretariat shall coordinate related proposals submitted in accordance with Section 4.3.2 to facilitate the hearing process.

5.8 Code Change Agenda: All code change proposals shall be posted on the ICC website at least 30 days prior to the First Committee Action Hearing (CAH #1) on those proposals and shall constitute the agenda for the hearing. Any errata to the Code Change Agenda shall be posted on the ICC website as soon as possible. Code change proposals which have not been published in the original posting or subsequent errata shall not be considered.

6.0 First Committee Action Hearing (CAH #1)

6.1 Intent: The intent of the First Committee Action Hearing (CAH #1) is to permit interested parties to present their views including the cost and benefits on the code change proposals on the published agenda. The Committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals.

6.2 Code Development Committee: The Codes and Standards Council shall review all applications and make Committee appointment recommendations to the ICC Board. The Committees shall be appointed by the ICC Board. (See Section 1.6 for terminology).

6.2.1 Chairperson/Moderator: The Chairperson and Vice-Chairperson shall be selected by the Codes and Standards Council from the appointed members of the Committee. The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Committee Action Hearing.

6.2.2 Conflict of Interest: A Committee member shall withdraw from and take no part in those matters with which the Committee member has an undisclosed financial, business or property interest. The Committee member shall not participate in any Committee discussion, or any Committee vote on the matter in which they have an undisclosed interest. A Committee member who is a proponent of a code change proposal shall not participate in any Committee discussion on the matter or any Committee vote. Such Committee member shall be permitted to participate in the floor discussion in accordance with Section 6.5 and Section 8.4.1 by stepping down from the dais.

6.2.3 Representation of Interest: Committee members shall not represent themselves as official or unofficial representatives of the ICC except at regularly convened meetings of the Committee.

6.2.4 Committee Composition: The Committee may consist of representation from multiple interests. A minimum of thirty-three and one-third percent (33.3%) of the Committee members shall be Regulators (General Interest category in accordance with CP#7 – Committees and Members).

6.3 Date and Location: The date and location of the Committee Action Hearing shall be announced not less than 60 days prior to the date of the hearing.

6.4 General Procedures: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Committee Action Hearing except as a specific provision of these Rules of Procedure may otherwise dictate. A quorum shall consist of a majority of the voting members of the Committee.

6.4.1 Chair Voting: The Chairperson of the Committee shall vote only when the vote cast will break a tie vote of the Committee.

6.4.2 Open Hearing: The Committee Action Hearing is an open hearing. Any interested

person may attend and participate in the floor discussion. Only Committee members may participate in the Committee action portion of the hearings (see Section 6.6). Participants shall not advocate a position on specific code change proposals with Committee members other than through the methods provided in this policy.

6.4.3 Presentation of Material at the Committee Action Hearing: Information to be provided at the hearing shall be limited to verbal presentations and modifications submitted in accordance with Section 6.5.2. Each individual presenting information at the hearing shall state their name and affiliation, and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 4.3.5.3 and other material submitted in response to a code change proposal shall be located in a designated area in the hearing room and shall not be distributed to the Committee at the public hearing.

6.4.4 Agenda Order: The Secretariat shall publish a Code Change Agenda for the Committee Action Hearing, placing individual code change proposals in a logical order to facilitate the hearing. Any public hearing attendee may move to revise the agenda order as the first order of business at the hearing, or at any time during the hearing except while another code change proposal is being discussed. Preference shall be given to grouping like subjects together, and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

6.4.4.1 Proponent Approval: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance in the hearing room and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to change the hearing order is not debatable.

6.4.4.2 Revised Agenda Order Approved: A motion to revise the agenda order is subject to a 2/3 vote of those present.

6.4.5 Tabling: Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Code Change Agenda for the code change proposals under consideration, or

2. To a specific location in the Code Change Agenda for the code change proposals under consideration.

6.4.5.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

6.4.5.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 6.4.5 Items 1 or 2. The

testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

6.4.6 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on by the Committee in accordance with Section 6.6.

6.4.7 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person testifying on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall identify the time limits on debate at the beginning of the hearing. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

6.4.7.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

6.4.7.2 Proponent Testimony: The Proponent is permitted to waive an initial statement. The Proponent shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where the code change proposal is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to be allotted additional time for rebuttal.

6.4.8 Points of Order: Any person participating in the hearing may challenge a procedural ruling of the Moderator or the Chairperson. A majority vote of ICC Members in attendance shall determine the decision.

6.5 Floor Discussion: The Moderator shall place each code change proposal before the hearing for discussion by identifying the proposal and by regulating discussion as follows:

6.5.1 Discussion Order:

1. Support. The Moderator shall begin by asking the proponent and then others in support of the code change proposal for their comments.
2. Opposition. After discussion by those in support of a code change proposal, those opposed hereto, if any, shall have the opportunity to present their views.
3. Rebuttal in support. Those in support shall then have the opportunity to rebut points raised by those in opposition.
4. Rebuttal in opposition. Those in opposition shall then have the opportunity to respond to the rebuttal in support.

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6.5.2 Modifications: Modifications to code change proposals may be suggested from the floor by any person participating in the hearing. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification.

6.5.2.1 Submission. All modifications shall be submitted electronically to the ICC Secretariat in a format determined by ICC unless determined by the Chairperson to be either editorial or minor in nature. The modification will be forwarded electronically to the members of the Committee during the hearing and will be projected on the screen in the hearing room.

6.5.2.2 Criteria. The Chairperson shall rule proposed modifications in or out of order before they are discussed on the floor. A proposed modification shall be

ruled out of order if it:

1. changes the scope of the original code change proposal; or

2. is not readily understood to allow a proper assessment of its impact on the original code change proposal or the Code.

The ruling of the Chairperson on whether or not the modification is in or out of order shall be final and is not subject to a point of order in accordance with Section 6.4.8.

6.5.2.3 Testimony. When a modification is offered from the floor and ruled in order by the Chairperson, a specific floor discussion on that modification is to commence in accordance with the procedures listed in Section 6.5.1.

6.5.2.3.1 Time Limits: Time limits on testimony on a modification shall be in accordance with the following:

1. Support: 1 minute
2. Opposition: 1 minute
3. Rebuttal in support: 30 seconds
4. Rebuttal in opposition: 30 seconds

6.6 Committee Action: Following the floor discussion of each code change proposal, one of the following motions shall be made and seconded by members of the Committee:

1. Approve the code change proposal As Submitted (AS) or
2. Approve the code change proposal As Modified with specific modifications (AM), or
3. Disapprove the code change proposal (D)

Discussion on this motion shall be limited to Committee members. If a Committee member proposes a modification which had not been proposed during floor discussion, the Chairperson shall rule on the modification in accordance with Section 6.5.2.2. If a Committee member raises a matter of issue, including a proposed modification, which has not been proposed or discussed during the floor discussion, the Moderator shall suspend the Committee discussion and shall reopen the floor discussion for comments on the specific matter or issue. Upon receipt of all comments from the floor, the Moderator shall resume Committee discussion.

The Committee shall vote on each motion with the majority dictating the Committee's action. Committee action on each code change proposal shall be completed when one of the motions noted above has been approved. Each Committee vote shall be supported by a reason.

The ICC shall maintain a record of the hearing proceedings including the action on each code change proposal.

6.7 Report of the First Committee Action Hearing (CAH #1): The results of the First Committee Action Hearing (CAH #1), including Committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Second Committee Action Hearing (CAH #2) , except as approved by the ICC Board.

7.0 Submittal of Comments to the First Committee Action Hearing (CAH #1) (New)

7.1 Intent: Any interested person, persons or group may submit a comment noting disagreement with the action taken at the First Committee Action Hearing (CAH #1). The comment process gives attendees at the Second Committee Action Hearing (CAH #2) an opportunity to consider

specific objections to the results of the First Committee Action Hearing (CAH #1) and more thoughtfully prepare for the discussion and comment consideration at the Second Committee Action Hearing (CAH #2).

7.1.1 Public Comment Hearing consideration: In order for a code change proposal to be considered for a further modification at the Public Comment Hearing, such proposal must have received a comment and been considered and acted upon at the Second Committee Action Hearing (CAH #2).

7.1.2 Proposed New Reference Standards and Standards Updates: Proposed new referenced standards and proposed updates of existing standards with coordinating text are limited to original code change submittals in accordance with Section 4.6.3. Comments proposing a new reference standard or a new proposed update of an existing standard with coordinating text shall not be permitted.

7.2 Deadline: The deadline for receipt of a comment to the results of the First Committee Action Hearing (CAH #1) shall be announced at the first hearing but shall not be less than 30 days subsequent to the availability of the Report of the First Committee Action Hearing (CAH #1) (see Section 6.7).

7.3 Withdrawal of Comment: A comment may be withdrawn by the commenter at any time prior to comment consideration of that comment at the Second Committee Action Hearing (CAH #2). A withdrawn comment shall not be subject to consideration at the second hearing. If the only comment to a code change proposal is withdrawn by the commenter prior to consideration at the Second Committee Action Hearing (CAH #2), such proposal will be considered as not acted upon at the second hearing and the proposal is not eligible for further modification consideration at the Public Comment Hearing in accordance with Section 7.1.1.

7.4 Form and Content of Comments: Any interested person, persons, or group may submit a public comment to the results of the First Committee Action Hearing (CAH #1) which will be considered when in conformance to these requirements. Each comment to a code change proposal shall be submitted separately and shall be complete in itself. Each comment shall contain the following information:

7.4.1 Comment: Each comment shall include the name, title, and email address of the commenter. Email addresses shall be published with the comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or committee submits a comment, an individual with prime responsibility shall be indicated. If a comment is submitted on behalf a client, group, organization or committee, the name and email address of the client, group, organization or committee shall be indicated. The scope of the comment shall be consistent with the scope of the original code change proposal or the Committee action. Comments which are determined as not within the scope of the code change proposal or Committee action shall be identified as such. The commenter shall be notified that the comment is considered an incomplete comment in accordance with Section 7.5.1 and the comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 4.3.5.5 shall be provided with the comment.

7.4.2 Code Reference: Each comment shall include the code change proposal number.

7.4.3 Multiple comments to a code change proposal. A commentor shall not submit multiple comments to the same code change proposal. When a commentor submits multiple comments to the same code change proposal, the comments shall be considered as incomplete comments and processed in accordance with Section 7.5.1. This restriction shall not apply to comments that attempt to address differing subject

matter within a Code section.

7.4.4 Desired Action at the Second Committee Action Hearing (CAH #2): In order for a comment to be considered, the comment shall indicate the desired action at the Second Committee Action Hearing (CAH #2) as one of the following:

1. Approve the code change proposal As Submitted (AS), or

2. Approve the code change proposal As Modified by the Committee modification published in the Report of the First Committee Action Hearing (AMC #1) or a comment published in the Second Committee Action Hearing Agenda (AMC #2), or

3. Disapprove the code change proposal (D)

7.4.5 Supporting Information: The comment shall include a statement containing a reason and justification for the desired action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 7.5 and determined as not germane to the technical issues addressed in the code change proposal or first Committee action may be identified as such. The commenter shall be notified that the comment is considered an incomplete comment in accordance with Section 7.5.1 and the comment shall be held until the deficiencies are corrected. The commenter shall have the right to appeal this action in accordance with CP#1 – Appeals. A bibliography of any substantiating material submitted with a comment shall be published with the comment and the substantiating material shall be made available at the Second Committee Action Hearing (CAH #2). Supporting documentation may be provided via a link to a website provided by the commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

7.4.6 Cost Impact: The comment shall include a cost impact statement in accordance with Section 17.0.

7.4.7 Online submittal: Each comment and substantiating information shall be submitted online via cdpACCESS. Additional electronic copies may be requested when determined necessary by the Secretariat.

7.4.8 Submittal Deadline: ICC shall establish and post the submittal deadline for each cycle in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the comment deadline. Each comment shall be submitted online via cdpACCESS by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

7.5 Review: The Secretariat shall be responsible for reviewing all submitted comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 5.2).

7.5.1 Incomplete Comment: When a comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the comment shall not be processed. The Secretariat shall notify the commenter of the specific deficiencies and the comment shall be held until the deficiencies are corrected, or the comment shall be returned to the commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected comment.

7.5.2 Duplications: On receipt of duplicate or parallel comments, the Secretariat may

consolidate such comments for Second Committee Action Hearing (CAH #2) comment consideration. Each commenter shall be notified of this action when it occurs.

7.5.3 Comments Received after Deadline: Comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the Second Committee Action Hearing (CAH #2) consideration. This deadline shall not apply to comments submitted by the Code Correlation Committee. In order to correlate submitted comments with action taken at the First Committee Action Hearing (CAH #1) on code change proposals that did receive a comment, the Code Correlation Committee, in conjunction with staff processing of comments, shall review the submitted comments and submit the necessary comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Second Committee Action Hearing (CAH #2) Agenda as required in Section 7.6.

7.6 Second Committee Action Hearing Agenda: The comments received to the First Committee Action Hearing (CAH #1) results on code change proposals shall constitute the Second Committee Action Hearing Agenda. The agenda shall be posted on the ICC website at least 30 days prior to the hearing. Any errata to the agenda shall be posted on the ICC website as soon as possible. Code change proposals and comments which have not been published in the original posting or subsequent errata shall not be considered.

8.0 Second Committee Action Hearing (CAH #2) (New)

8.1 Intent: The intent of the Second Committee Action Hearing (CAH #2) is to permit interested parties to present their views including cost and benefits on comments received to the action taken by the Committee at the First Committee Action Hearing (CAH #1). The Committee will consider such comments as may be presented in the development of their action on the disposition of such code change proposals prior to the public comment portion of the code development process in accordance with Section 9.0.

8.1.1 Code changes not receiving a comment: The Committee action on code changes that do not receive a comment shall be the action taken at the First Committee Action Hearing (CAH #1) and shall not be on the agenda for the Second Committee Action Hearing (CAH #2). Such code changes will not be eligible for further modification as part of public comment consideration (see Section 7.1.1)

8.2 Committee: The Committee shall be the same Committee that presided over the First Committee Action Hearing (CAH #1).

8.3 Date and Location: The date and location of the Second Committee Action Hearing (CAH #2) shall be announced not less than 60 days prior to the date of the hearing.

8.4 Hearing conduct: The Second Committee Action Hearing (CAH #2) shall be conducted in the same fashion as the First Committee Action Hearing (CAH #1) in accordance with Sections 6.2 through 6.4 and 6.6 and Section 8.4.1.

8.4.1 Floor discussion. Discussion on code change proposals being individually considered shall be in accordance with Sections 8.4.1.1 through 8.4.1.4:

8.4.1.1 Initial Discussion: The Committee action from the First Committee Action Hearing (CAH #1) shall be the basis of the initial discussion.

8.4.1.2 Introducing Comments: At any point during the initial floor discussion , a comment published in the CAH#2 Agenda may be called to the floor. Each subsequent comment called to the floor, if any, shall be individually discussed

before returning to the initial floor discussion. Comments in the CAH#2 agenda must be called to the floor for consideration.

8.4.1.3 Proponent testimony: The Proponent of a comment is permitted to waive an initial statement. The Proponent of the comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

8.4.1.4 Modifications: Modifications to individual comments may be suggested from the floor by any person participating in the hearing, at any time during the floor discussion of the respective comment. The person proposing the modification, or his/her designee, is deemed to be the proponent of the modification. Modifications submission, criteria, testimony, and time limits shall comply with Sections 6.5.2.1 through 6.5.2.3.1

8.5 Report of the Second Committee Action Hearing (CAH #2): The results of the Second Committee Action Hearing (CAH #2), including Committee action and reason, shall be posted on the ICC website not less than 60 days prior to the Public Comment Hearing, except as approved by the ICC Board.

9.0 Submittal of Public Comments to the Second Committee Action Hearing (CAH #2)

9.1 Intent: The public comment process gives attendees at the Public Comment Hearing an opportunity to consider specific objections to the results of the Second Committee Action Hearing (CAH #2) for each code group and more thoughtfully prepare for the discussion for public comment consideration. The public comment process expedites the Public Comment Hearing by limiting the items discussed to consideration of items for which a public comment has been submitted. The Public Comment Hearing will be a combined hearing of both Code Group A and Code Group B code change proposals and public comments in accordance with Sections 3.0 and 10.0.

9.2 Deadline: The deadline for receipt of a public comment to the results of the Second Committee Action Hearing (CAH #2) shall be announced at the hearing but shall not be less than 30 days subsequent to the availability of the Report of the Second Committee Action Hearing (CAH #2) for the respective code group (see Section 8.5). The public comment deadline for Code Group A codes shall be early in the second year of the cycle and the public comment deadline for Code Group B codes shall be early in the third year of the cycle with specific dates posted in accordance with Section 3.2.

9.3 Withdrawal of Public Comment: A public comment may be withdrawn by the public commenter at any time prior to public comment consideration of that comment. A withdrawn public comment shall not be subject to public comment consideration. If the only public comment to a code change proposal is withdrawn by the public commenter prior to the vote on the consent agenda in accordance with Section 10.5.5, the proposal shall be considered as part of the consent agenda. If the only public comment to a code change proposal is withdrawn by the public commenter after the vote on the consent agenda in accordance with Section 10.5.5, the proposal shall continue as part of the individual consideration agenda in accordance with Section 10.5.6, however the public comment shall not be subject to public comment consideration.

9.4 Form and Content of Public Comments: Any interested person, persons, or group may submit a public comment to the results of the Second Committee Action Hearing (CAH #2) which will be considered when in conformance to these requirements. Each public comment to

a code change proposal shall be submitted separately and shall be complete in itself. Each public comment shall contain the following information:

9.4.1 Public comment: Each public comment shall include the name, title, and email address of the public commenter. Email addresses shall be published with the public comments unless the commenter otherwise requests on the submittal form.

If a group, organization, or Committee submits a public comment, an individual with prime responsibility shall be indicated. If a public comment is submitted on behalf a client, group, organization or Committee, the name and email address of the client, group, organization or Committee shall be indicated. The scope of the public comment shall be consistent with the scope of the original code change proposal or Committee action from the Second Committee Action Hearing (CAH #2). Public comments which are determined as not within the scope of the code change proposal or Committee action shall be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 9.5.1 and the public comment shall be held until the deficiencies are corrected. A copyright release in accordance with Section 4.3.5.5 shall be provided with the public comment.

9.4.2 Code Reference: Each public comment shall include the code change proposal number.

9.4.3 Multiple public comments to a code change proposal. A proponent shall not submit multiple public comments to the same code change proposal. When a proponent submits multiple public comments to the same code change proposal, the public comments shall be considered as incomplete public comments and processed in accordance with Section 9.5.1. This restriction shall not apply to public comments that attempt to address differing subject matter within a code section.

9.4.4 Desired Final Action: In order for a public comment to be considered, the public comment shall indicate the desired Final Action as one of the following:

1. Approve the code change proposal As Submitted (AS), or
2. Approve the code change proposal As Modified by the Committee modification published in the Report of the First or Second Committee Action Hearing (AMC) or published in a public comment in the Public Comment Agenda (AMPC), or

3. Disapprove the code change proposal (D)

9.4.5 Supporting Information: The public comment shall include a statement containing a reason and justification for the desired Final Action on the code change proposal. Reasons and justification which are reviewed in accordance with Section 9.5 and determined as not germane to the technical issues addressed in the code change proposal or Committee action may be identified as such. The public commenter shall be notified that the public comment is considered an incomplete public comment in accordance with Section 9.5.1 and the public comment shall be held until the deficiencies are corrected. The public commenter shall have the right to appeal this action in accordance with CP#1 – Appeals. A bibliography of any substantiating material submitted with a public comment shall be published with the public comment and the substantiating material shall be made available at the Public Comment Hearing. Supporting documentation may be provided via a link to a website provided by the public commenter and included in the reason statement and bibliography. The reason statement shall include the date the link was created. All substantiating material published by ICC is material that has been provided by the proponent and in so publishing ICC makes no representations or warranties about its quality or accuracy.

9.4.6 Cost Impact: The public comment shall include a cost impact statement in accordance with section 17.0.

9.4.7 Online submittal: Each public comment and substantiating information shall be submitted online via cdpACCESS. Additional electronic copies may be requested when determined necessary by the Secretariat.

9.4.8 Submittal Deadline: ICC shall establish and post the submittal deadlines for Code Groups A and B in accordance with Section 3.2. The posting of the deadline shall occur no later than 120 days prior to the public comment deadlines. Each public comment shall be submitted online via cdpACCESS by the posted deadline. The submitter of a public comment is responsible for the proper and timely receipt of all pertinent materials by the Secretariat.

9.5 Review: The Secretariat shall be responsible for reviewing all submitted public comments from an editorial and technical viewpoint similar to the review of code change proposals (see Section 5.2).

9.5.1 Incomplete Public Comment: When a public comment is submitted with incorrect format, without the required information or judged as not in compliance with these Rules of Procedure, the public comment shall not be processed. The Secretariat shall notify the public commenter of the specific deficiencies and the public comment shall be held until the deficiencies are corrected, or the public comment shall be returned to the public commenter with instructions to correct the deficiencies with a final date set for receipt of the corrected public comment.

9.5.2 Duplications: On receipt of duplicate or parallel public comments, the Secretariat may consolidate such public comments for public comment consideration. Each public commenter shall be notified of this action when it occurs.

9.5.3 Public Comments Received after Deadline: Public comments received by the Secretariat after the deadline set for receipt shall not be published and shall not be considered as part of the public comment consideration. This deadline shall not apply to public comments submitted by the Code Correlation Committee. In order to correlate submitted public comments with action taken at the Second Committee Action Hearing (CAH #2) on code change proposals that did receive a public comment, the Code Correlation Committee, in conjunction with staff processing of public comments, shall review the submitted public comments and submit the necessary public comments in order to facilitate the coordination of code change proposals. Such review and submittal shall not delay the posting of the Public Comment Agenda as required in Section 9.6.

9.6 Public Comment Agenda: The First and Second Committee Action Hearing results on code change proposals that have not received a public comment and code change proposals from the Second Committee Action Hearing (CAH #2) which received public comments shall constitute the Public Comment Agenda. The Public Comment Agenda shall be posted on the ICC website at least 30 days prior the Public Comment Hearing. Any errata to the Public Comment Agenda shall be posted on the ICC website as soon as possible. Code change proposals and public comments which have not been published in the original posting or subsequent errata shall not be considered.

10.0 Public Comment Hearing

10.1 Intent: The Public Comment Hearing is the first of two steps to make a final determination on all code change proposals which have been considered in a code development cycle by a vote cast by eligible voters (see Section 12.0). The second step, which follows the Public Comment Hearing, is the Online Governmental Consensus Vote that is conducted in accordance with

Section 11.0. Code change proposals from Code Groups A and B considered at the Second Committee Action Hearing (CAH #2) in accordance with Section 8.1 are eligible for public comment consideration at the Public Comment Hearing and the Online Governmental Consensus Vote.

10.2 Date and Location: The date and location of the Public Comment Hearing shall be announced not less than 60 days prior to the date of the hearing.

10.3 Moderator: The ICC President shall appoint one or more Moderators who shall act as presiding officer for the Public Comment Hearing.

10.4 Public Comment Agenda: The Public Comment Consent Agenda shall be comprised of code change proposals which have not received a public comment. The agenda for public testimony and individual consideration shall be comprised of proposals which have a public comment (see Section 9.1).

10.5 Procedure: *The Robert's Rules of Order* shall be the formal procedure for the conduct of the Public Comment Hearing except as these Rules of Procedure may otherwise dictate.

10.5.1 Open Hearing: The Public Comment Hearing is an open hearing. Any interested person may attend and participate in the floor discussion.

10.5.2 Agenda Order: The Secretariat shall publish a Public Comment Agenda for the Public Comment Hearing, placing individual code change proposals and public comments in a logical order to facilitate the hearing. The proponents or opponents of any code change proposal or public comment may move to revise the agenda order as the first order of business at the public hearing, or at any time during the hearing except while another proposal is being discussed. Preference shall be given to grouping like subjects together and for moving items back to a later position on the agenda as opposed to moving items forward to an earlier position.

10.5.2.1 Proponent Approval: A motion to revise the agenda order is considered in order unless the proponent(s) of the moved code change proposals are in attendance at the hearing and object to the move. Where such objections are raised, the motion to revise the hearing order shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to change the hearing order is not debatable.

10.5.2.2 Revised Agenda Order Approved: A motion to revise the agenda order is subject to a 2/3 vote of those present.

10.5.3 Tabling: Tabling of code change proposals shall be permitted. The motion to table is considered in order unless the proponent(s) of the tabled code change proposals are in attendance at the hearing and object to the tabling. Where such objections are raised, the motion to table shall be ruled out of order by the Moderator. The ruling of the Moderator shall be final and not subject to a point of order in accordance with Section 6.4.8. The motion to table is not debatable.

The motion to table must identify one of the following as to the location in the agenda when or where the code change proposal(s) will be considered:

1. To a specific date and time within the timeframe of the Public Comment Agenda for the code change proposals under consideration, or
2. To a specific location in the Public Comment Agenda for the code change proposals under consideration.

10.5.3.1 Tabling approved: A motion to table is subject to a 2/3 vote of those present.

10.5.3.2 Tabled code change proposals back to the floor: The Moderator shall bring the tabled code change proposal(s) back to the floor at the applicable time/agenda location in accordance with Section 10.5.3 Items 1 or 2. The testimony on the code change proposal shall resume at the point in the process where the tabling occurred.

10.5.4 Presentation of Material at the Public Comment Hearing: Information to be provided at the hearing shall be limited to verbal presentations. Each individual presenting information at the hearing shall state their name and affiliation and shall identify any entities or individuals they are representing in connection with their testimony. Audio-visual presentations are not permitted. Substantiating material submitted in accordance with Section 9.4.5 and other material submitted in response to a code change proposal or public comment shall be located in a designated area in the hearing room.

10.5.5 Public Comment Consent Agenda: The Public Comment Consent Agenda (see Section 10.4) shall be placed before the assembly with a single motion for Final Action in accordance with the results of the First and Second Committee Action Hearings. When the motion has been seconded, the vote shall be taken with no testimony being allowed. A simple majority (50% plus one) based on the number of votes cast by eligible voters shall decide the motion. This action shall not be subject to the Online Governmental Consensus Vote following the Public Comment Hearing (see Section 11.0).

10.5.6 Public Comment Individual Consideration Agenda: Upon completion of the Public Comment Consent Agenda vote, all code change proposals not on the Public Comment Consent Agenda shall constitute the Public Comment Individual Consideration Agenda and be placed before the assembly for individual consideration of each item (see Section 10.4).

10.5.6.1 New Proposed Standard or Updated Standard Not Available. It is the responsibility of the proponent of the code change proposal to identify whether a new standard or updated standard (where the proposal includes coordinating text revisions) is available. Where the proposed new standard or the updated standard is not available in accordance with Section 4.6.3, the code change will not be considered on the Individual Consideration Agenda and the Final Action shall be Disapproval.

10.5.7 Reconsideration: There shall be no reconsideration of a code change proposal after it has been voted on in accordance with Section 10.5.9.

10.5.8 Time Limits: Time limits shall be established as part of the agenda for testimony on all code change proposals at the beginning of each hearing session. Each person testifying on a code change proposal shall be given equal time. In the interest of time and fairness to all hearing participants, the Moderator shall identify the time limits on debate at the beginning of the Public Comment Hearing. The Moderator shall have the authority to adjust time limits as necessary in order to complete the hearing agenda.

10.5.8.1 Time Keeping: Keeping of time for testimony by an individual shall be by an automatic timing device. Remaining time shall be evident to the person testifying. Interruptions during testimony shall not be tolerated. The Moderator shall maintain appropriate decorum during all testimony.

10.5.9 Discussion and Voting: Discussion and voting on code change proposals being individually considered shall be in accordance with the following procedures and the voting majorities in Section 10.6:

10.5.9.1 Proponent testimony: The Proponent of a public comment is permitted to

waive an initial statement. The Proponent of the public comment shall be permitted to have the amount of time that would have been allocated during the initial testimony period plus the amount of time that would be allocated for rebuttal. Where a public comment is submitted by multiple proponents, this provision shall permit only one proponent of the joint submittal to waive an initial statement.

10.5.9.2 Points of Order: Any person participating in hearing may challenge a procedural ruling of the Moderator. A majority vote of ICC Members in attendance shall determine the decision.

10.5.9.3 Eligible voters: Voting shall be limited to eligible voters in accordance with Section 12.0.

10.5.9.4 Allowable Final Action Motions: The only allowable motions for Final Action are Approval as Submitted (AS), Approval as Modified by the Committee from the First or Second Committee Action Hearing (AMC) or by one or more modifications published in the Public Comment Agenda (AMPC), and Disapproval (D).

10.5.9.5 Initial Motion: The Committee action from the Second Committee Action Hearing (CAH #2) shall be the initial motion considered.

10.5.9.6 Motions for Modifications: Whenever a motion under consideration is for Approval as Submitted or Approval as Modified, a subsequent motion and second for a modification published in the Public Comment Agenda may be made (see Section 9.4.4). Each subsequent motion for modification, if any, shall be individually discussed and voted before returning to the main motion. A two-thirds majority based on the number of votes cast by eligible voters shall be required for a successful motion on all modifications.

10.5.9.7 Voting: After dispensing with all motions for modifications, if any, and upon completion of discussion on the main motion, the Moderator shall then ask for the vote on the main motion. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If the motion fails to receive the majority required in Section 10.6, the Moderator shall ask for a new motion.

10.5.9.8 Subsequent Motion: If the initial motion is unsuccessful, a motion for either Approval as Submitted or Approval as Modified by one or more published modifications is in order. A motion for Disapproval is not in order. The vote on the main motion shall be taken electronically with the vote recorded and each vote assigned to the eligible voting member. In the event the electronic voting system is determined not to be used by ICC, a hand/standing count will be taken by the Moderator. If a successful vote is not achieved, Section 10.5.9.9 shall apply.

10.5.9.9 Failure to Achieve Majority Vote at the Public Comment Hearing. In the event that a code change proposal does not receive any of the required majorities in Section 10.6, the results of the Public Comment Hearing for the code change proposal in question shall be Disapproval. The vote count that will be reported as the Public Comment Hearing result will be the vote count on the main motion in accordance with Section 10.5.9.7.

10.5.9.10 Public Comment Hearing Results: The result and vote count on each code change proposal considered at the Public Comment Hearing shall be announced at the hearing. In the event the electronic voting system is not utilized and a hand/standing count is taken in accordance with Sections 10.5.9.7 and 10.5.9.8, the vote count will not be announced if an individual standing vote count is not taken. The results shall be posted and included in the Online Governmental Consensus Vote ballot (see Section 11.3).

10.5.9.10.1 Online Governmental Consensus Ballot Exceptions: Where Disapproval is the action at all three hearings in the code group cycle (First Committee Action Hearing (CAH #1), Second Committee Action Hearing (CAH #2) and the Public Comment Hearing), the Final Action on the code change proposal shall be Disapproval and the proposal shall not be placed on the Online Governmental Consensus Vote ballot.

10.6 Majorities for Public Comment Hearing Voting: The required voting majority for code change proposals individually considered shall be based on the number of votes cast by eligible voters at the Public Comment Hearing shall be in accordance with the following table.

Second Committee Action Hearing (CAH #2)	**Desired Final Action**		
	AS	**AMC/AMPC**	**D**
AS	Simple Majority	2/3 Majority	Simple Majority
AMC	2/3 Majority	Simple Majority to sustain the Committee Action (AMC) or; 2/3 Majority on each additional modification and 2/3 Majority on entire code change proposal for AMPC	Simple Majority
D	2/3 Majority	2/3 Majority	Simple Majority

11.0 Online Governmental Consensus Vote

11.1 Public Comment Hearing Results: The results from the Individual Consideration Agenda at the combined Code Group A and Code Group B Public Comment Hearing (see Sections 10.5.6 and 10.5.9.10) shall be the basis for the Online Governmental Consensus Vote. The ballot shall include the voting options in accordance with the following table (see Section 11.1.1 for exceptions):

Second Committee Action Hearing (CAH #2)	**Public Comment Hearing result and Voting Majority**	**Online Governmental Consensus Ballot and Voting Majority**	
AS	**AS:** Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** Simple Majority	**D:** Simple Majority
AMC	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority

	AMC: Simple Majority	**AMC:** Simple Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AM:** Simple Majority	**D:** Simple Majority
D	**AS:** 2/3 Majority	**AS:** 2/3 Majority	**D:** Simple Majority
	AMPC: 2/3 Majority	**AMPC:** 2/3 Majority	**D:** Simple Majority
	D: Simple Majority	**AS:** 2/3 Majority	**D:** Simple Majority

11.1.1 Online Governmental Consensus Ballot Exceptions: Where Disapproval is the action at all three hearings in the code group cycle (First Committee Action Hearing (CAH #1), Second Committee Action Hearing (CAH #2) and the Public Comment Hearing), the Final Action on the code change proposal shall be Disapproval and the proposal shall not be placed on the Online Governmental Consensus Vote ballot.

11.2 Online Governmental Consensus Vote Voter Statement: In order to vote on the Online Governmental Consensus Vote, the eligible voter is required to acknowledge the following in order to proceed to the ballot:

1. I am currently an employee or public official actively engaged either full or part time in the administration, formulation, implementation or enforcement of laws, ordinances, rules or regulations relating to the public health, safety and welfare, or have Honorary Member status.
2. I am participating in this ICC activity in compliance with the ICC Code of Ethics (see Section 1.8), and I will avoid any circumstance that could create the appearance of a conflict of interest or otherwise compromise professional integrity.
3. As an eligible voting member, I have done my due diligence to become an informed voter on the matters that I am voting on, or as a representative of an ICC Governmental Member, my vote is being directed by the Governmental Member.
4. I am aware that voter guides that seek to influence or recommend voter positions are not endorsed by the International Code Council, and I understand that I am under no obligation to vote in accordance with any such voter guides.
5. I will not vote on any code change that would provide me with a direct personal financial benefit.
6. I will not vote on any code change that would provide a direct financial benefit to any individual or company with which I have a business interest or relationship.

11.3 Online Governmental Consensus Vote Ballot: The ballot for each code change proposal considered at the Public Comment Hearing will include:

1. The Public Comment Hearing result and vote count.
2. The allowable Online Governmental Consensus Vote actions in accordance with Section 11.1.
3. Where the Public Comment Hearing result is As Submitted (AS) or Disapproval (D), the original code change proposal will be presented.
4. Where the Public Comment Hearing result is As Modified by the Committee (AMC) or As Modified by one or more Public Comments (AMPC), the original code change and approved modification(s) will be presented.
5. The Committee action taken at the First and Second Committee Action Hearings.
6. ICC staff identification of correlation issues.
7. For those who voted at the Public Comment Hearing, the ballot will indicate how they voted, unless an electronic vote count is not taken in accordance with Section 10.5.9.10.
8. An optional comment box to provide comments.

9. Access to the Public Comment Agenda which includes: the original code change, the report of the Committee action and the submitted public comments.
10. Access to the audio and video of the First and Second Committee Action and Public Comment Hearing proceedings.
11. Identification of the ballot period for which the online balloting will be open.

11.4 Voting process: Voting shall be limited to eligible voters in accordance with Section 12.0. Eligible voters are authorized to vote during the Public Comment Hearing and during the Online Governmental Consensus Vote; however, only the last vote cast will be included in the final vote tabulation. The ballot period will not be extended beyond the published period except as approved by the ICC Board.

11.4.1 Participation requirement: A minimum number of participants to conduct the Online Governmental Consensus Vote shall not be required unless the code change proposal(s) were not voted upon utilizing the electronic voting devices at the Public Comment Hearing and the resulting vote was not assigned to each eligible voting member in accordance with Sections 10.5.9.7 and 10.5.9.8. If this occurs, a minimum number of participants as determined by the ICC Board shall be required for those code change proposal(s) based on an assessment of the minimum number of votes cast during the entire Public Comment Hearing. The Online Governmental Consensus Vote shall determine the Final Action on the code change proposal(s) in accordance with Section 13.1.

12.0 Eligible Final Action Voters

12.1 Eligible Final Action Voters: Eligible Final Action voters include ICC Governmental Member Voting Representatives and Honorary Members in good standing who have been confirmed by ICC in accordance with the Electronic Voter Validation System. Such confirmations are required to be revalidated once each code development cycle. After initial validation, changes to the list of GMVRs for the remainder of the code development cycle shall be made in accordance with Section 12.2. Eligible Final Action voters in attendance at the Public Comment Hearing and those participating in the Online Governmental Consensus Vote shall have one vote per eligible voter on all Codes. Individuals who represent more than one Governmental Member shall be limited to a single vote.

12.2 Applications: Applications, whether new or renewed, for Governmental Membership must be received by the ICC at least 180 days prior to the Group A and B Public Comment Hearing in order for its designated representatives to be eligible to vote at the Group A and B Public Comment Hearing or Online Governmental Consensus Vote. Applications, whether new or updated, for Governmental Member Voting Representative status (validation) must be received by the Code Council 30 days prior to the commencement of the first day of the Code Group A and B Public Comment Hearing in order for any designated representative to be eligible to vote. An individual designated as a Governmental Member Voting Representative shall provide sufficient information to establish eligibility as defined in the ICC Bylaws. The Executive Committee of the ICC Board, in its discretion, shall have the authority to address questions related to eligibility.

13.0 Tabulation, Certification and Posting of Results

13.1 Tabulation and Validation: Following the closing of the online ballot period, the votes received will be combined with the vote tally at the Code Group A and B Public Comment Hearing to determine the final vote on the code change proposal. If a hand/standing count is utilized per Subsection 10.5.9.7 or 10.5.9.8, those votes of the Public Comment Hearing will not be combined with the online ballot. ICC shall retain a record of the votes cast and the results shall be certified by a validation Committee appointed by the ICC Board. The validation Committee shall report the results to the ICC Board, either confirming a valid voting process and result or

citing irregularities in accordance with Section 13.2.

13.2 Voting Irregularities: Where voting irregularities or other concerns with the Online Governmental Consensus Voting process which are material to the outcome or the disposition of a code change proposal(s) are identified by the Validation Committee, such irregularities or concerns shall be immediately brought to the attention of the ICC Board. The ICC Board shall take whatever action necessary to ensure a fair and impartial Final Action vote on all code change proposals, including but not limited to:

1. Set aside the results of the Online Governmental Consensus Vote and have the vote taken again.
2. Set aside the results of the Online Governmental Consensus Vote and declare the Final Action on all code change proposals to be in accordance with the results of the Public Comment Hearing.
3. Other actions as determined by the ICC Board.

13.3 Failure to Achieve Majority Vote: In the event a code change proposal does not receive any of the required majorities for Final Action in Section 11.1, the Final Action on the code change proposal in question shall be Disapproval.

13.4 Final Action Results: The Final Action on all code change proposals shall be published as soon as practicable after certification of the results. The results shall include the Final Action taken, including the vote tallies from both the Public Comment Hearing and Online Governmental Consensus Vote, as well as the required majority in accordance with Section 11.1. ICC shall maintain a record of individual votes for auditing purposes; however, the record shall not be made public. The exact wording of any resulting text modifications shall be made available to any interested party.

14.0 Code Publication

14.1 Next Edition of the Codes: The Final Action results on code change proposals shall be the basis for the subsequent edition of the respective Code.

14.2 Code Correlation: The Code Correlation Committee is authorized to resolve technical or editorial inconsistencies resulting from actions taken during the Code Development Process by making appropriate changes to the text of the affected code. The process to resolve technical or editorial inconsistencies shall be conducted in accordance with CP#44 – Code Correlation Committee.

15.0 Appeals

15.1 Right to Appeal: Any person may appeal an action or inaction in accordance with CP#1 – Appeals. Any appeal made regarding voter eligibility, voter fraud, voter misrepresentation or breach of ethical conduct must be supported by credible evidence and must be material to the outcome of the final disposition of a code change proposal(s).

The following actions are not appealable:

1. Variations of the results of the Code Group A and B Public Comment Hearing compared to the Final Action result in accordance with Section 13.4.
2. Denied requests to extend the voter balloting period in accordance with Section 11.4.
3. Lack of access to cdpACCESS to submit a code change proposal, to submit a comment to a Committee action, to submit a public comment or to vote.
4. Code Correlation Committee changes made in accordance with Section 14.2.

16.0 Violations

16.1 ICC Board Action on Violations: Violations of the policies and procedures contained in this Council Policy shall be brought to the immediate attention of the ICC Board for response and resolution. Additionally, the ICC Board may take any actions it deems necessary to maintain the integrity of the code development process.

17.0 Cost Impacts.

17.1 Cost Impact Statement Requirements. The proponent shall indicate one of the following regarding the cost impact of the code change proposal or the net cost impact of the code change proposal and comment submitted:

1. The code change proposal's estimated immediate cost impacts; or
2. The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction.

The proponent shall submit information which substantiates such assertion. This information will be considered by the Committee and will be included in the published code change proposal. Supporting documentation may be provided via a link to a website provided by the proponent and included in the cost substantiation statement. The cost substantiation statement shall include the date the link was created.

Any proposal submitted which does not include the requisite cost impact information shall be considered incomplete and shall not be processed.

1. The cost estimates provided shall be straightforward, allowing the Code Development Committee (CDC) members and eligible voting members, to rapidly assess their relative validity.
2. The cost estimates shall (a) have succinct information to allow the average person to understand how it was calculated (methodology), and (b) may provide reference for the publicly available data used (basis for variables).
3. The ICC may develop a cost impact guidance document to assist code change and comment submitters in complying effectively with the cost impact requirements.

Sections revised in July 12, 2024 revision to CP#28:
8.4.1.1
8.4.1.2

Section revised in April 6, 2024 revision to CP#28:
Section 12.2

Sections revised in December 8, 2023 revision to CP#28:
Section 1.4
Section 4.3.5.3
Section 6.2.2
Section 7.4.5
Section 8.4.
Section 17.1

Section added in October 7, 2023 revision to CP#28
Section 17 cost impacts and consolidates the language for reference throughout CP#28.

Sections revised in October 7, 2023 revision to CP#28:
Section 4.3.5.6

Section 7.4.6
Section 9.4.6

Sections added in December 7, 2022 revision to CP#28:
Sections 3.0, 7.0 and 8.0 added for the new process effective with the 2024/2026 Cycle, and coordination of process requirements throughout based on these new sections
Added Section 6.5.2.3.1
Added Sections 10.5.9.10.1 and 11.1.1

Sections revised in July 16, 2021 revision to CP#28:
8.2

Sections revised in December 3, 2020 revision to CP#28:
3.3.5.4
3.3.5.4.1
5.4.3
5.4.3.1
5.4.4.1
5.4.4.2
5.4.4.3
5.4.4.4
5.4.5
5.4.5.1
5.4.5.2
5.4.5.3
5.4.5.4
5.4.8
5.4.8.1

Sections revised in November 2, 2020 revisions to CP#28:
5.7 (removal of entire section)
2.5
5.1
5.4.2
5.8
6.1
6.4.1
6.6
7.4

Section revised in January 1, 2019 revision to CP#28:
9.1

Sections revised in October 20, 2018 revision to CP#28:
2.3
2.3.1
2.3.1.1
2.3.1.2
2.3.2
2.3.2.1
2.3.2.2
2.3.2.3
2.3.2.3
2.3.2.5
2.3.2.6

2.3.2.7
2.3.2.8
2.3.2.9
2.3.2.10
2.3.2.11

Sections revised in July 27, 2018 revision to CP#28:

4.6.1

Sections revised in December 8, 2017 revision to CP#28:

3.3.5.5
8.3.1

Sections revised in September 9, 2017 revision to CP#28:

3.2
3.3.5.3
3.3.5.4
3.3.5.6
3.6.3.1.1
3.6.3.1.2
4.6
5.4.4
5.4.4.1
5.4.4.2
5.4.5
5.4.5.1
5.4.5.2
5.5.2
5.5.2.2
6.4.5
6.4.6
7.5.2
7.5.2.1
7.5.2.2
7.5.3
7.5.3.1
7.5.3.2
7.5.9.10
8.2 – Number 7
11.2

WITHDRAWN CODE CHANGES

The following code change proposal was withdrawn subsequent to the Committee Action Hearings (CAH 2):

F278-24

Code change proposals withdrawn during the committee action hearing #2 are indicated as such in the 2024 Report of Committee Action Hearings (CAH #2). Any proposals withdrawn after CAH #1 and before the beginning of CAH #2 will be announced at the CAH #2 hearing.

2024 COMMITTEE ACTION (CAH #2) HEARING SCHEDULE

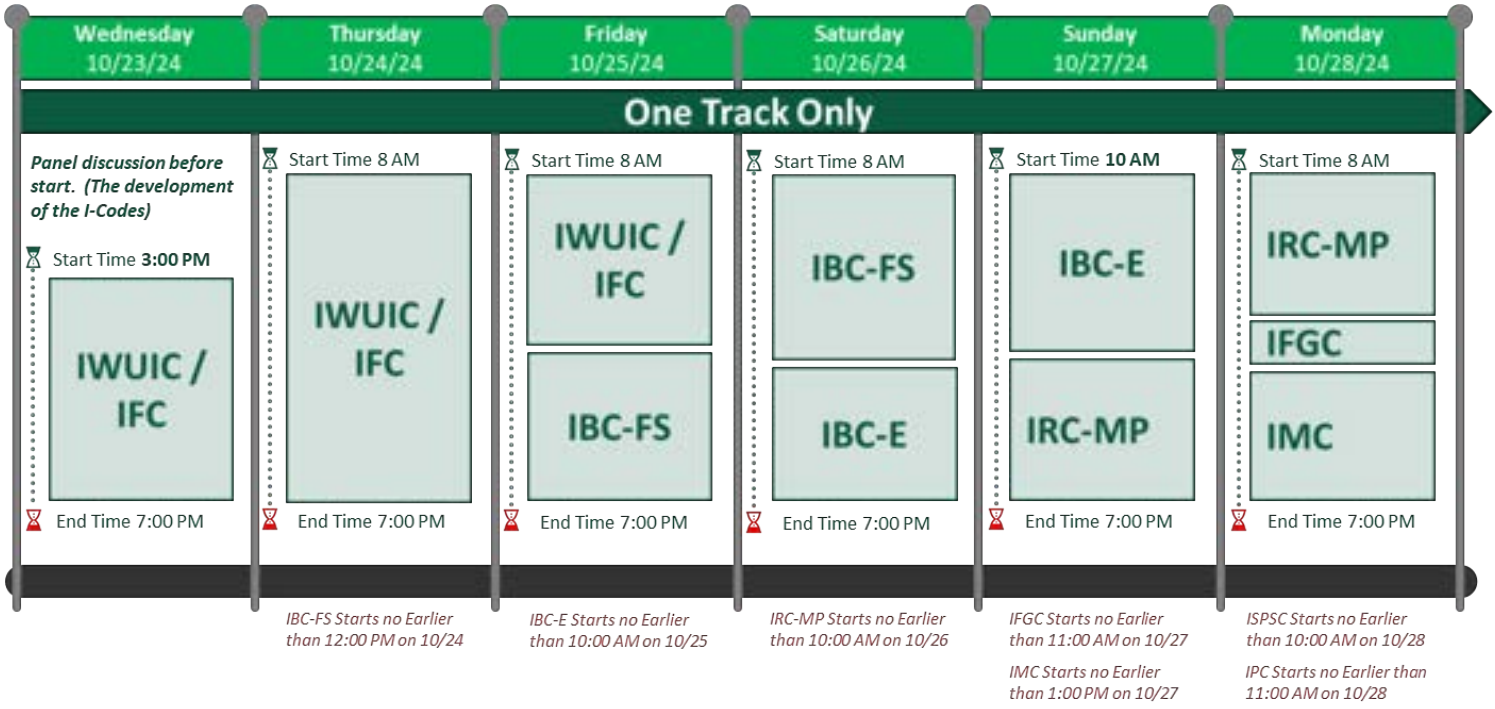
October 23rd – 31st

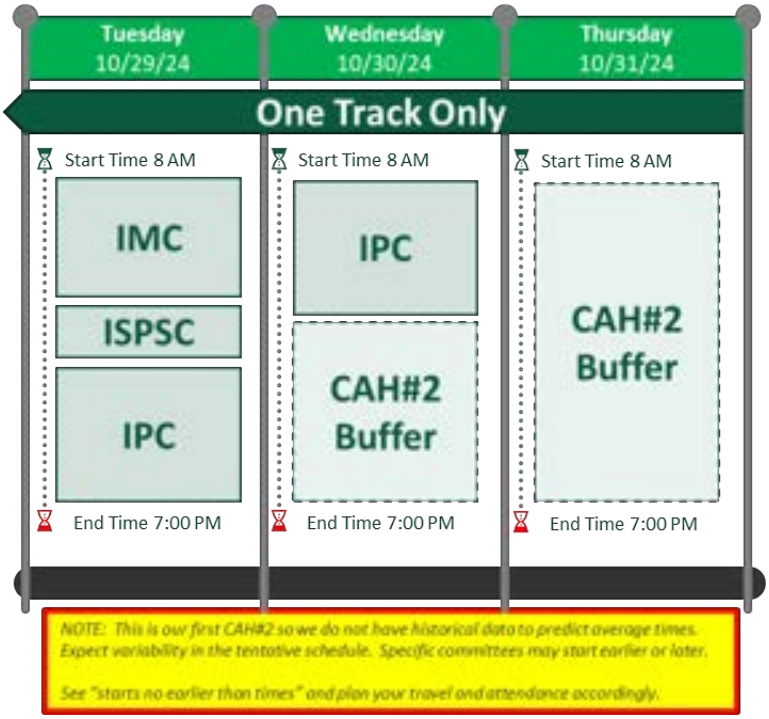
Long Beach Convention Center, Long Beach, CA

This year the code action hearings will start with a panel discussion 3:00 PM (Pacific Time) October 23, 2024. This will allow for Membership Council meetings to be held prior to the start of the hearings and CAH attendees to participate in the panel discussion event.

The hearings will be conducted in-person only. The hearings will be streamed live for individuals wishing to watch them online (note this is a watch only option).

Unless noted by "Start no earlier than…" each Code Committee will begin immediately upon completion of the hearings for the prior Committee. This includes moving a Committee forward or back from the day indicated based on hearing progress. The actual start times for the various Committees are not stipulated because of uncertainties in hearing progress. The schedule anticipates that the hearings will finish on the date indicated in the schedule provided below. This may require going beyond the scheduled finish time.





Committee	*Starts no earlier than information*
IBC-E	10 AM (Pacific Time) on 10/25
IBC-FS	12 PM (Pacific Time) on 10/24
IFC	First Committee at CAH#2
IFGC	11 AM (Pacific Time) on 10/27
IMC	1 PM (Pacific Time) on 10/27
IPC	11 AM (Pacific Time) on 10/28
IRC-MP	10 AM (Pacific Time) on 10/26
ISPSC	10 AM (Pacific Time) on 10/28

Important Notes

1. Comments to CAH#1 Code change agenda to be posted on or before September 5, 2024.
2. Hearing times may be modified at the discretion of the Chair based on hearing progress.
3. Morning and afternoon breaks will be announced. A lunch break is planned. A dinner break is not planned. The hearings are scheduled to adjourn for dinner and resume the next day, unless otherwise necessary to complete the agenda.
4. Because of uncertainties in hearing progress, the start time indicated as “Start No Earlier than [8 AM or 12:00 PM]” is conservatively estimated and is not intended to be a hearing progress target.
5. Consult the hearing order in the posted code change agenda for:
   a. Comments to CAH#1 for Code changes to be heard by a Committee other than the Committee under which the code change is designated.
   b. Comments to CAH#1 for Code changes comprised of multiple parts where each part is heard by a different Committee.
   c. Comments to CAH#1 for Code changes to the definitions to determine the applicable Committee who will hear the change to the definition for the respective code.

TENTATIVE HEARING ORDER
FOR EACH INDIVIDUAL CONSIDERATION AGENDA

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Code changes to be heard out of numerical order or to be heard with a different code designation are indented. Be sure to review the cross index on page xliv for code change which affect codes other than those under their respective code change number prefix.

For the most up to date committee rosters please see ICC's Committees and Councils Page

IWUIC
(Includes IBC: G)
(See page 1)
G12-24 Part V
WUIC3-24
WUIC11-24
WUIC12-24
WUIC13-24
G1-24 Part VIII
WUIC16-24
WUIC18-24
WUIC20-24
WUIC22-24
WUIC23-24
WUIC26-24
WUIC27-24
WUIC28-24
WUIC36-24
WUIC37-24
WUIC39-24
WUIC42-24
WUIC44-24
WUIC45-24
WUIC46-24
WUIC48-24
WUIC51-24
WUIC53-24
WUIC54-24
WUIC55-24
WUIC60-24
WUIC70-24
WUIC71-24
WUIC72-24

IFC
(Includes IBC: G)
(See page 162)
F36-24
F40-24
F5-24
F43-24
F44-24
F45-24
F48-24
F53-24
F56-24
G12-24 Part II
F58-24
F230-24
F61-24
F62-24
F67-24
F70-24
F72-24
F73-24
F74-24
F82-24
G29-24
F86-24
F88-24
F90-24
F93-24
F100-24
F102-24
F103-24
F13-24
F108-24
F110-24
F111-24
F116-24
F117-24
F152-24
F153-24
F159-24
F161-24
F162-24
F168-24 Part I
M37-24
F175-24
F176-24
F180-24
F181-24
F184-24
F190-24
F193-24
F194-24
F197-24
F201-24
F203-24
F205-24
F210-24
F213-24
F218-24
F225-24
F231-24
F23-24
F24-24
F26-24
F7-24
F34-24
F199-24
F198-24
G26-24
F245-24
F247-24
F248-24
F249-24
F251-24
F253-24
F260-24
F41-24
F264-24
F270-24
F276-24
F280-24

IBC – FIRE SAFETY
(Includes IBC: G & S)
(See page 670)
G7-24
G11-24
G12 Part 1
FS2-24
FS6-24
FS7-24
FS9-24
FS10-24
FS13-24
FS14-24
FS15-24
FS16-24
FS17-24
FS21-24 Part I
FS23-24
FS24-24
FS26-24
FS31-24
FS35-24
FS36-24
FS41-24
FS42-24
FS47-24
FS49-24
FS50-24
FS53-24
FS55-24
FS56-24
FS61-24
FS62-24
FS63-24
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FS67-24
FS69-24
FS75-24
FS76-24
FS79-24
FS85-24
FS86-24
FS87-24
FS94-24
FS98-24
FS101-24
FS103-24
FS104-24
FS108-24
FS112-24
FS113-24
FS117-24
FS121-24
S2-24
S4-24
S5-24
S9-24

IBC – EGRESS
(Includes IBC: G)
(See page 856)
E1-24 Part I
G2-24
G3-24
G8-24 Part I
G9-24
G14-24
E3-24
E8-24
E10-24
E15-24
E18-24
E19-24
E22-24
E23-24
E24-24

E25-24
E28-24
E31-24
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E89-24
E91-24
E93-24
E96-24
E97-24
E107-24
E110-24
E111-24
E114-24
E117-24
E119-24
E120-24
E122-24
E123-24
E127-24 Part I
F217-24 Part II

IRC – MECHANICAL
(See page 1233)
RM1-24
RM2-24
RM5-24
RM6-24
RM7-24

IRC – PLUMBING
(See page 1249)
P4-24 Part II
P42-24 Part II
P62-24 Part II
P54-24 Part II
P52-24 Part II
P53-24 Part II
P73-24 Part II
RP3-24
RP7-24
RP8-24
P99-24 Part II
P104-24 Part II
P117-24 Part II
P125-24 Part II
P157-24 Part II
P162-24 Part II

IFGC
(Includes IADMIN)
(See page 1257)
ADM1-24
FG1-24
FG4-24
FG11-24 Part I

IMC
(Includes IADMIN)
(See page 1268)
M2-24
M3-24
M5-24
M7-24
M8-24
M9-24
M11-24
M18-24
M21-24
M22-24
M28-24
M39-24
M40-24
M44-24 Part II
M47-24 Part II
M50-24
M51-24
F168-24 Part II
M63-24
M64-24
M65-24
M69-24
M84-24
M85-24
M87-24
M89-24

ISPSC
(See page 1363)
SP3-24
SP16-24
SP17-24
P19-24 Part III
SP29-24
SP30-24

IPSDC
(See page 1385)
PSD1-24

IPC
(Includes IBC: G)
(See page 1396)
P1-24
P4-24 Part I
P7-24
P10-24
P19-24 Part I
P26-24
G28-24
P30-24
P31-24
P33-24
P44-24
P52-24 Part I
P53-24 Part I
P54-24 Part I
P55-24
P59-24
P60-24
P67-24
P73-24 Part I
P83-24
P93-24
P95-24
P97-24
P99-24 Part I
P104-24
P105-24
P106-24
P107-24
P108-24
P110-24
P111-24
P113-24
P115-24
P116-24
P117-24 Part I
P120-24
P121-24
P125-24 Part I
P127-24
P128-24
P129-24
P130-24
P150-24
P152-24
P157-24 Part I
P162-24 Part I
G1-24 Part VI

COMMITTEE ACTION CONCURRENCE

Comments that were submitted for CAH #2 that aligned with the committee action at CAH #1 and no other comments were received have not been included on the individual comment agenda. These proposals will essentially be placed on the consent agenda to be voted upon at the PCH in April of 2026. For informational purposes the proposals had comments that concurred with the committee action are listed here.

F63-24
F185-24
FS19-24
FS43-24
FS80-24
FS82-24
FS83-24
FS84-24
FS89-24
FS118-24
FS118-24
FS119-24
FS119-24
FS120-24
M84-24
P87-24
RM6-24
WUIC29-24
WUIC30-24
WUIC32-24
WUIC33-24
WUIC50-24

2024 GROUP A ICC CODE DEVELOPMENT CYCLE
CROSS INDEX OF PROPOSED CODE CHANGES ON THE COMMITTEE ACTION AGENDA (CAH #2) FOR INDIVIDUAL CONSIDERATION

Some of the proposed code changes include sections that are outside of the scope of the chapters or the code listed in the table of 2024-2026 Staff Secretaries on page xiii. This is done in order to facilitate coordination among the International Codes which is one of the fundamental principles of the International Codes.

Listed in this cross index are proposed code changes that include sections of codes or codes other than those listed on page ix. For example, IEBC Section 1508.1 is proposed for revision in code change F217-24 Part II which is to be heard by the IBC Means of Egress committee. It is therefore identified in this cross index. In some instances, there are other subsections that are revised by an identified code change that is not included in the cross index.

This information is provided to assist users in locating all of the proposed code changes that would affect a certain section or chapter. For example, to find all of the proposed code changes that would affect Chapter 4 of the IBC, review the proposed code changes in the portion of the monograph for the IBC (listed with a F prefix) then review this cross reference for Chapter 4 of the IBC for proposed code changes published in other code change groups. While care has been taken to be accurate, there may be some omissions in this list.

Letter prefix: Each proposed change number has a letter prefix that will identify where the proposal is published. The letter designations for proposed changes and the corresponding publications are as follows:

PREFIX	**PROPOSED CHANGE GROUP (see monograph table of contents for location)**
E	International Building Code - Means of Egress
F	International Fire Code
FG	International Fuel Gas Code
FS	International Building Code - Fire Safety
G	International Building Code – General
M	International Mechanical Code
P	International Plumbing Code
PSD	International Private Sewage Disposal Code
S	International Building Code – Structural
SP	International Swimming Pool and Spa Code
WUIC	International Wildland-Urban Interface Code

INTERNATIONAL BUILDING CODE	
SECTION #	**CODE CHANGE #**
CHAPTER 1	
112.2	F211-24
CHAPTER 2	
ACCESS (TO) (New)	E1-24 Part 1
ADULT CHANGING STATIONS (New)	E127-24 Part I
AEROSOL	F7-24
ASPHYXIANT	F9-24
ASSISTED BATHING (New)	E126-24 Part I
ASSISTED TOILETING (New)	E126-24 Part I
ASSISTIVE TABLE (New)	E127-24 Part I
AUTOMATIC FIRE DETECTION SYSTEM	F10-24
BACKED VINYL SIDING	FS111-24
CLINICAL NEED (New)	G2-24
COMBUSTIBLE LIQUID	F12-24
COMMERCIAL MOTOR VEHICLE	F13-24
COMPRESSED GAS	F14-24
CONTROL AREA	F17-24
CONTROL VESTIBULE (New)	E61-24
CONTINUITY HEAD-OF-WALL SYSTEM	FS29-24
CORROSIVE	F15-24
CRYOGENIC FLUID	F16-24
CRYOGENIC FLUID, FLAMMABLE	F16-24
CRYOGENIC FLUID, INERT	F16-24
CRYOGENIC FLUID, OXIDIZING	F16-24
DRAINAGE PLANE (New)	S9-24
DRAINAGE SPACE (New)	S9-24
EMERGENCY HELICOPER LANDING AREA (EHLF)	F180-24
EXIT	E97-24
EXIT PATHWAY (New)	E97-24
EXPLOSIVE	F18-24
FAMILY OR COMPANION BATHING ROOM (New)	E126-24 PART I
FAMILY OR COMPANION TOILET ROOM (New)	E126-24 PART I
FIRESTOP IDENTIFICATION DEVICE (New)	FS42-24
FLAMMABLE CRYOGENIC FLUID	F16-24
FLAMMABLE GAS	F19-24, F21-24
FLAMMABLE LIQUID	F12-24
FLAMMABLE SOLID	F20-24

INTERNATIONAL BUILDING CODE	
FUEL GAS ALARM (New)	F152-24
FUEL GAS DETECTOR (New)	F152-24
FUEL GAS DETECTION SYSTEM (New)	F152-24
FUEL GAS SOURCE (New)	F152-24
HIGHLY TOXIC	F23-24
INERT COMPRESSED GAS	F24-24
LANDING (New)	E48-24
LIQUID STORAGE ROOM	F25-24
LIQUID STORAGE WAREHOUSE	F25-24
LIQUID USE, DISPENSING AND MIXING ROOM	F25-24
NONCOMBUSTIBLE MATERIAL (New)	G12-24 Part I
MANUFACTURER'S INSTALLATION INSTRUCTIONS (New)	FS43-24
MAGNESIUM-OXIDE-CEMENT PANEL PRODUCT (New)	FS113-24
OCCUPANT SENSOR CONTROL (New)	E32-24
ORGANIC PEROXIDE	F26-24, F270-24
OXIDIZER	F27-24
OXIDIZING CRYOGENIC FLUID	F16-24
OXIDIZING GAS	F28-24
PARTY WALL (New)	FS22-24
PYROPHORIC	F29-24
READY ACCESS (TO) (New)	E1-24 Part I
REMOTE SYSTEM ACCESS	F127-24, F128-24
RESTRICTED AUDIBLE MODE OPERATION (RAMO) NOTIFICATION	F135-24, F136-24
SOCIAL STAIRS (New)	E124-24
STUCCO BOND BREAK (New)	S9-24
TOXIC	F23-24
UNSTABLE(REACTIVE) MATERIAL	F32-24
VERTIPORT	F180-24
VERTISTOP	F180-24
WATER REACTIVE MATERIAL	F33-24
CHAPTER 3	
307.1	F234-24
TABLE 307.1(1)	F235-25, F236-24, F237-24, F270-24
TABLE 307.1(2)	F235-24
307.1.1	F233-24, F234-24
TABLE 307.1.1	FS21-24 Part I, F233-24, F260-24
307.3	F270-24
307.5	F270-24

INTERNATIONAL BUILDING CODE	
CHAPTER 4	
402.4.2.2	FS21-24 Part I
402.4.2.3	FS21-24 Part I
402.8.7	FS21-24 Part I
402.4.2.1	FS21-24 Part I
403.2.1	FS38-24
403.2.1.2	FS38-24
403.3	FS21-24 Part II
403.4.8.1	FS21-24 Part II
403.5.3, 403.5.3.1	E53-24
404.3	FS21-24 Part II
404.6	FS21-24 Part I
405.4.2	FS21-24 Part I
405.4.3	FS21-24 Part I
405.5.8 (New)	F97-24
406.3.1	FS21-24 Part I
406.6.4.1	FS21-24 Part I
407.3	FS21-24 Part I
407.4.4.2	FS21-24 Part I
407.5	FS21-24 Part I
408.7	FS21-24 Part I
410.4.1	FS21-24 Part I
410.4.2	FS21-24 Part I
412.4.1	FS21-24 Part I
412.3.4	FS21-24 Part I
412.3.6.2	FS21-24 Part II
412.5.5	F25-24
412.7	F180-24
412.7.1 - 412.7.4	F180-24
414.2.1	FS21-24 Part II
414.2.3	FS21-24 Part II
TABLE 414.2.5.2	F241-24
TABLE 414.2.5.4	F240-24, F241-24
TABLE 414.5.1	F270-24
TABLE 415.6.5	F270-24
415.6.5	F238-24
415.9.1	F25-24
415.9.1.1	F25-24
415.9.1.4	F25-24
415.9.2	F25-24
415.9.2.1	F25-24

INTERNATIONAL BUILDING CODE	
415.9.2.2	F25-24
415.9.2.3	F25-24
415.9.2.4	F25-24
415.9.3	F25-24
415.9.3.1	F25-24
415.9.3.2	F25-24
415.10.2	FS21-24 Part II
415.10.4	FS21-24 Part II
415.11.1.2	FS21-24 Part II
415.11.1.6	FS21-24 Part II
415.11.6.1	FS21-24 Part II
415.11.6.2	FS21-24 Part II
TABLE 415.11.1.1	F192-24, F270-24
416.2	FS21-24 Part II
418.4	FS21-24 Part II
418.5	FS21-24 Part II
418.6	FS21-24 Part II
420.2	FS21-24 Part I
420.3	FS21-24 Part I
420.6	FS21-24 Part I
422.2	FS21-24 Part I
426.1.2	FS21-24 Part II
427.2.1	FS21-24 Part II
427.2.2	FS21-24 Part II
428.3.1	FS21-24 Part II
CHAPTER 5	
503.1	FS21-24 Part I
508.4.4.1	FS21-24 Part I
TABLE 509.1	F159-24
509.4.1	FS21-24 Part I
510.7.1	FS21-24 Part I
510.8	FS21-24 Part I
CHAPTER 6	
602.1	FS45-24
CHAPTER 7	
701.1	G1-24 Part I
703.5	E1-24 Part I
CHAPTER 8	
801.1	G1-24 Part I

INTERNATIONAL BUILDING CODE	
CHAPTER 9	See IFC Committee Chapter 9 for IBC Chapter 9
901.1	G1-24 Part I
903.2.2	F231-24
903.2.2.3	F231-24
903.2.1.6	F97-24
903.2.3	F98-24
903.2.4	F64-24
903.2.4.4 (New)	F99-24
903.2.5.6	F269-24
903.2.7	F231-24
903.2.7.4	F231-24
903.2.8	F100-24
903.2.8.1	F100-24
903.2.8.2	F100-24
903.2.8.3	F100-24, F101-24
903.2.8.4 (New)	F102-24
903.2.8.5 (New)	F103-24
903.2.9.2	F104-24, F105-24
903.2.9.4	F106-24
903.2.10	F107-24
903.2.10.3 (New)	F108-24
903.2.11.4	F109-24
903.3.1.1.2	F110-24
903.3.1.1.3	F111-24, F112-24
TABLE 903.3.1.1.3(1) (New)	F112-24
903.3.1.3	F100-24
903.4.1	F113-24
903.3.9	F113-24
903.4.3	F113-24
904.2.1	F114-24
904.3.3	F115-24
904.3.5	F116-24
904.7.1 (New)	F117-24
904.14	F115-24
904.15.1.2	F118-24
905.3.5	F180-24
905.3.8 (New)	F120-24
905.4	F121-24, F122-24
905.5	F122-24
905.6	F122-24
TABLE 906.1	F231-24
906.5	F124-24, F125-24
906.9	F126-24
906.9.2	F126-24

INTERNATIONAL BUILDING CODE	
907.1.4 (New)	F127-24, F128-24
907.2.9.3	F129-24
907.2.11	F130-24
907.2.11.1	F130-24
907.2.11.2	F130-24
907.2.22	F131-24, F132-24
907.2.22.1	F132-24
907.2.22.2	F132-24
907.2.23	F169-24
907.2.24	F99-24
907.3	F133-24
907.5.2.1	F134-24
907.5.2.2	F134-24
907.5.2.1.3	F135-24, F136-24
907.5.2.3.1	F137-24
907.6.6	F138-24
909.12.2	F139-24
TABLE 910.2	F140-24
910.3.5	F141-24
910.4.3	F142-24
911.1.6	F144-24
912.2.2	F146-24
912.2.3 (New)	F147-24
912.5	F146-24
912.5.1	F146-24
912.5.2	F146-24
912.5.3	F146-24
912.5.4	F146-24
913.4	F113-24
915 (ALL)	F148-24
915.3.2	F149-24
915.3.3	F149-24
915.5.4	F149-24
916.1	F150-24
916.3	F150-24
916.4	F150-24
916.5	F150-24
916.6	F150-24
916.7	F150-24
916.8	F150-24
916.9	F150-24
916.10	F150-24
916.11	F150-24
917.1	F151-24

INTERNATIONAL BUILDING CODE	
917.2	F151-24
918 (New)	F152-24
CHAPTER 10	
1001, 1001.2	G1-24 Part II
TABLE 1004.5	P19-24 Part II
1009.6.4	FS21-24 Part I
1023.2	FS21-24 Part I
1023.3.1	FS21-24 Part I
1023.12.1	FS21-24 Part I
1024.3	FS21-24 Part I
1026.2	FS21-24 Part I
1028.2	FS21-24 Part I
1030.1.1.1	FS21-24 Part I
CHAPTER 11	
1101.1	G1-24 Part II
CHAPTER 12	
1210.2.2	G28-24
1210.3.2	E126-24 Part II
CHAPTER 14	
1401.1	G1-24 Part I
CHAPTER 16	
1607.9.1.1	E1-24 Part I
CHAPTER 17	
1704.2.2	E1-24 Part I
CHAPTER 18	
1807.2.4	E1-24 Part I
CHAPTER 21	
2111.3.1	E1-24 Part I
2113.9.2	E1-24 Part I
CHAPTER 24	
2405.3.3	E1-24 Part I
2406.4.3	E1-24 Part I
2406.4.6	E28-24

INTERNATIONAL BUILDING CODE	
CHAPTER 26	
2601.1	G1-24 Part I
CHAPTER 27	
2702.1.3	F163-24
2702.1.9 (New)	F164-24
2702.2	F145-24
2702.2.7	F145-24
CHAPTER 28	
2801.1	G1-24 Part VII
CHAPTER 29	
2901.1	G1-24 Part VI
2902.1	P14-24
TABLE 2902.1	P14-24, P15-24, P16-24, P17-24, P18-24, P19-24 Part I, P20-24
2902.1.1	P14-24, P20-24, P21-24, P22-24
2902.1.2	E126-24 Part II, P14-24
2902.2	P23-24, P24-24, P25-24
2902.3	P26-24
2902.3.3	P27-24
2902.3.6	E126-24 Part II
2903.1.2	P28-24, P29-24
CHAPTER 30	
3005.4	FS21-24 Part I
3006.3	FS21-24 Part I
3008.9	E1-24 Part I
CHAPTER 31	
3104.5.1	FS21-24 Part I
3104.5.2	F97-24
3302.1.1	F210-24
CHAPTER 33	
3302.1.1	F211-24
3310.1	F217-24 Part II
3310.2	F217-24 Part I
3311.1 - 3311.3	F217-24 Part I
3312.1 - 3312.2	F216-24
3313.1	F211-24, F219-24
Appendix F	
F101.5.1	E1-24 Part I

INTERNATIONAL BUILDING CODE	
Appendix H	
H110.1	E1-24 Part I
INTERNATIONAL EXISTING BUILDING CODE	
CHAPTER 15	
1508.1	F217-24 Part II
1510.1 - 1510.2	F216-24
1508.2	F217-24 Part I
1509.1 - 1509.3	F217-24 Part I
1512.1	F219-24
INTERNATIONAL FIRE CODE	
CHAPTER 2	
CLINICAL NEED (New)	G2-24
CONTROL VESTIBULE (New)	E61-24
EXIT	E97-24
EXIT PATHWAY (New)	E97-24
LANDING (New)	E48-24
NONCOMBUSTIBLE MATERIAL (New)	G12-24 Part II
OCCUPANT SENSOR CONTROL (New)	E32-24
[M]READY ACCESS (TO)	E1-24 Part IV
WILDFIRE RISK AREA	E1-24 Part II
203.6	G15-24
CHAPTER 3	
301.1	G1-24 Part VIII
CHAPTER 4	
401.1	G1-24 Part VIII
CHAPTER 5	
504.3	E77-24 Part II
508.1.2	FS21-24 Part II
CHAPTER 6	
601.1	G1-24 Part VIII
[M]606.2	M42-24, M43-24
605.4.2.6	FS21-24 Part II
CHAPTER 7	
701.1	G1-24 Part VIII
702	FS21-24 Part II
702.1	FS21-24 Part II
702.1 (New)	FS21-24 Part II

INTERNATIONAL FIRE CODE	
CHAPTER 8	
801.1	G1-24 Part VIII
CHAPTER 9	
901.1	G1-24 Part VIII
901.4.4	FS21-24 Part II
909.11.1	FS21-24 Part II
907.8.2	E1-24 Part II
909.20.2	FS21-24 Part I
909.20.5.1	FS21-24 Part I
910.4.5	FS21-24 Part II
914.3.1	FS21-24 Part II
914.4.1	FS21-24 Part II
914.3.2	G16-24
914.8.3.2	FS21-24 Part II
914.8.3	G20-24, G21-24
914.8.3.1	G22-24
914.8.3.2	G23-24
CHAPTER 10	See IBC Committee Chapter 10 for IFC Chapter 10
1001	E2-24 Part II
1001.1	E2-24 Part II, G1-24 Part VIII
[BE]1001.2	E2-24 Part I, G1-24 Part VIII
TABLE 1004.5	P19-24 Part II
1023.2	FS21-24 Part I
1023.3.1	FS21-24 Part I
1023.12.1	FS21-24 Part I
1026.2	FS21-24 Part I
1028.2	FS21-24 Part I
1030.1.1.1	FS21-24 Part I
CHAPTER 11	
1101.1	G1-24 Part VIII
CHAPTER 12	
1201.1	G1-24 Part VIII
1207.7.4	FS21-24 Part II
1207.9.5	WUIC33-24
CHAPTER 15	
1502.1.1	F210-24, F211-24
1512.1	F211-24

INTERNATIONAL FIRE CODE	
CHAPTER 20	
2001.1	G1-24 Part VIII
CHAPTER 21	
2101.1	G1-24 Part VIII
CHAPTER 22	
2201.1, 2201.1.1	G1-24 Part VIII
CHAPTER 23	
2301.1	G1-24 Part VIII
2311.8.3	FS21-24 Part II
2311.8.8	M25-24 Part II
CHAPTER 24	
2401.1	G1-24 Part VIII
2404.4	FS21-24 Part II
CHAPTER 25	
2501.1, 2501.1.1	G1-24 Part VIII
CHAPTER 27	
2701.1	G1-24 Part VIII
2703.14.2	FS21-24 Part II
CHAPTER 28	
2801.1	G1-24 Part VIII
CHAPTER 29	
2901.1, 2901.1.1	G1-24 Part VIII
CHAPTER 30	
3001.1	G1-24 Part VIII
3307.1.2	F218-24 Part II
CHAPTER 31	
3101.1, 3101.1.1	G1-24 Part VIII
CHAPTER 32	
3201.1	G1-24 Part VIII
3206.3.2	FS21-24 Part II
3207.2	FS21-24 Part II
3208.2	FS21-24 Part II

INTERNATIONAL FIRE CODE	
CHAPTER 33	
3301.1	G1-24 Part VIII
3307.1.2	F217-24 Part II
CHAPTER 34	
3401.1, 3401.1.1	G1-24 Part VIII
CHAPTER 36	
3601.1	G1-24 Part VIII
CHAPTER 37	
3701.1	G1-24 Part VIII
3704.3	FS21-24 Part II
3704.4	FS21-24 Part II
3704.5	FS21-24 Part II
CHAPTER 38	
3801.1, 3801.2, 3801.2.1, 3801.2.2	G1-24 Part VIII
3804.1.1.1	FS21-24 Part II
CHAPTER 39	
3901.1, 3901.1.1	G1-24 Part VIII
CHAPTER 40	
4001.1	G1-24 Part VIII
CHAPTER 41	
4101.1, 4101.1.1	G1-24 Part VIII
CHAPTER 50	
5001.1, 5001.1.1, 5001.1.2	G1-24 Part VIII
TABLE 5003.1.1(5)	FS21-24 Part II
5003.8.3.1	FS21-24 Part II
5003.8.3.3	FS21-24 Part II
CHAPTER 51	
5101.1	G1-24 Part VIII
CHAPTER 53	
5301.1, 5301.1.1, 5301.1.2, 5303.1, 5303.1.1, 5303.1.2	G1-24 Part VIII
5306.2.1	FS21-24 Part II
5306.2.2	FS21-24 Part II

INTERNATIONAL FIRE CODE	
CHAPTER 54	
5401.1, 5401.1.1,	G1-24 Part VIII
CHAPTER 55	
5501.1, 5501.1.1, 5501.1.2	G1-24 Part VIII
CHAPTER 56	
5601.1, 5601.1.1, 5601.1.2	G1-24 Part VIII
CHAPTER 57	
5701.1, 5701.2	G1-24 Part VIII
5705.3.7.5.1	M25-24 Part II
CHAPTER 58	
5801.1, 5801.1.1, 5801.1.2	G1-24 Part VIII
CHAPTER 59	
5901.1	G1-24 Part VIII
5906.4.2	FS21-24 Part II
CHAPTER 60	
6001.1, 6001.1.1	G1-24 Part VIII
CHAPTER 62	
6201.1	G1-24 Part VIII
CHAPTER 63	
6301.1, 6301.1.1, 6301.1.2	G1-24 Part VIII
6306.4	FS21-24 Part II
CHAPTER 64	
6401.1, 6401.1.1	G1-24 Part VIII
6404.1.4	FS21-24 Part II
CHAPTER 65	
6501.1	G1-24 Part VIII
CHAPTER 66	
6601.1, 6601.1.1, 6601.1.2	G1-24 Part VIII
CHAPTER 67	
6701.1, 6701.1.1	G1-24 Part VIII

INTERNATIONAL FUEL GAS CODE	
CHAPTER 2	
[M] ACCESS (TO)	E1-24 Part IV
[M] COMBUSTIBLE MATERIAL	M7-24
[M] NONCOMBUSTIBLE MATERIALS	G12-24 Part III
[M] READY ACCESS (TO)	E1-24 Part IV
INTERNATIONAL MECHANICAL CODE	
CHAPTER 2	
[M] ACCESS (TO)	E1-24 Part IV
FLOOR AREA, NET	G8-24 Part II
NET OCCUPIABLE FLOOR AREA	E1-24 Part IV
NONCOMBUSTIBLE MATERIAL	G12-24 Part IV
[M] READY ACCESS (TO)	E1-24 Part IV
CHAPTER 3	
301.1	G1-24 Part VII
CHAPTER 4	
401.1	G1-24 Part VII
CHAPTER 5	
501.1	G1-24 Part VII
502.7.3.2	F188-24
502.7.6	F189-24
502.10.1	F191-24
506.3.8	E1-24 Part IV
CHAPTER 6	
601.1	G1-24 Part VII
603.4.1	E1-24 Part IV
607.1.1	FS68-24
TABLE 607.3.2.1	FS69-24
607.3.3.1	FS70-24
607.3.3.4	FS71-24
607.5.2	FS72-24
607.5.3	FS73-24
607.6.1	FS75-24
607.6.2.1.1	FS77-24
607.6.2.1.2	FS77-24
CHAPTER 7	
701.1, 702.1, 702.2, 702.3	G1-24 Part VII

INTERNATIONAL MECHANICAL CODE	
CHAPTER 8	
805.9 (New)	F168-24 Part II
806.2 (New)	F168-24 Part II
CHAPTER 9	
901.1, 901.2	G1-24 Part VII
CHAPTER 10	
1001.1, 1001.2	G1-24 Part VII
CHAPTER 11	
1101.1	G1-24 Part VII
CHAPTER 12	
1201.1, 1201.2	G1-24 Part VII
CHAPTER 13	
1301.1, 1301.2	G1-24 Part VII
CHAPTER 14	
1401.1	G1-24 Part VII
CHAPTER 17	
1705.21	FS108-24
INTERNATIONAL PLUMBING CODE	
CHAPTER 2	
ADULT CHANGING STATIONS (New)	E127-24 Part II
ASSISTED BATHING (New)	E126-24 Part II
ASSISTED TOILETING (New)	E126-24 Part II
ASSISTIVE TABLE (New)	E127-24 Part II
FAMILY OR COMPANION TOILET ROOM (New)	E126-24 Part II
CHAPTER 3	
301.1	G1-24 Part VI
[M]314.2.1.1	M18-24
CHAPTER 4	
401.1	G1-24 Part VI
403.1.2	E126-24 Part II
403.3.6	E126-24 Part II
405.3.5	E126-24 Part II
427 (New)	E127-24 Part II

INTERNATIONAL PLUMBING CODE	
CHAPTER 5	
501.1	G1-24 Part VI
502.1	M60-24 Part II
CHAPTER 6	
601.1	G1-24 Part VI
CHAPTER 7	
701.1	G1-24 Part VI
CHAPTER 8	
801.1	G1-24 Part VI
CHAPTER 9	
901.1	G1-24 Part VI
CHAPTER 10	
1001.1	G1-24 Part VI
CHAPTER 11	
1101.1	G1-24 Part VI
CHAPTER 12	
1201.1, 1201.2	G1-24 Part VI
CHAPTER 13	
1301.1, 1301.1.1	G1-24 Part VI
CHAPTER 14	
1401.1	G1-24 Part VI
INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE	
CHAPTER 3	
301.1	G1-24 Part IV
CHAPTER 4	
401.1	G1-24 Part IV
CHAPTER 5	
501.1	G1-24 Part IV
CHAPTER 6	
601.1	G1-24 Part IV

INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE	
CHAPTER 7	
701.1	G1-24 Part IV
CHAPTER 8	
801.1	G1-24 Part IV
CHAPTER 9	
901.1	G1-24 Part IV
CHAPTER 10	
1001.1	G1-24 Part IV
CHAPTER 11	
1101.1	G1-24 Part IV
CHAPTER 12	
1201.1	G1-24 Part IV
CHAPTER 13	
1301.1	G1-24 Part IV
INTERNATIONAL RESIDENTIAL CODE	
CHAPTER 12	
M1201.1	G1-24 Part III
CHAPTER 13	
M1301.1	G1-24 Part III
TABLE M1306.2	E1-24 Part V
CHAPTER 14	
M1401.1	G1-24 Part III
M1402.1	M54-24 Part II
M1403.1	M54-24 Part II
M1411.10	M59-24 Part II
M1412.1	M54-24 Part II
M1413.1	M54-24 Part II
M1416.1	M57-24 Part II
CHAPTER 15	
M1501.1	G1-24 Part III
M1502.2	M38-24 Part II
M1502.4.8	M38-24 Part II
CHAPTER 16	
M1601.1	G1-24 Part III

INTERNATIONAL RESIDENTIAL CODE	
M1601.1.1	M47-24 Part II
CHAPTER 17	
M1701.1, M1701.2	G1-24 Part III
CHAPTER 18	
M1801.1	G1-24 Part III
M1803.4.1	E1-24 Part V
CHAPTER 19	
M1901.1	G1-24 Part III
M1905.1	M44-24 Part II
CHAPTER 20	
M2001.1	G1-24 Part III
M2005.1	M60-24 Part III
M2006.1	M54-24 Part II
M2006.2	E1-24 Part V
CHAPTER 21	
M2101.1	G1-24 Part III
CHAPTER 22	
M2201.1	G1-24 Part III
CHAPTER 23	
M2301.1	G1-24 Part III
CHAPTER 25	
P2501.1	G1-24 Part III
CHAPTER 26	
P2601.1	G1-24 Part III
CHAPTER 27	
P2701.1	G1-24 Part III
P2704.1	E1-24 Part V
P2706.1	E1-24 Part V
P2712.6	E1-24 Part V
P2720.2	E1-24 Part V
P2722.4	E1-24 Part V
CHAPTER 28	
P2801.1	G1-24 Part III

INTERNATIONAL RESIDENTIAL CODE	
CHAPTER 29	
P2901.1	G1-24 Part III
P2903.9.5	E1-24 Part V
P2903.10.1	E1-24 Part V
P2903.10.2	E1-24 Part V
P2903.10.3	E1-24 Part V
P2903.11	E1-24 Part V
P2911.5	E1-24 Part V
P2911.8.1	E1-24 Part V
P2911.9	E1-24 Part V
P2912.4	E1-24 Part V
P2912.8	E1-24 Part V
P2912.12	E1-24 Part V
CHAPTER 30	
P3001.1, P3001.2	G1-24 Part III
P3005.1.5	E1-24 Part V
P3007.2	E1-24 Part V
CHAPTER 31	
P3101.1	G1-24 Part III
CHAPTER 32	
P3201.1	G1-24 Part III
CHAPTER 33	
P3301.1	G1-24 Part III
P3302.1	E1-24 Part V
P3303.1.2	E1-24 Part V
P3303.1.4	E1-24 Part V
INTERNATIONAL SWIMMING POOL AND SPA CODE	
CHAPTER 2	
HANDRAIL	G10-24 Part II
SHOWER (New)	P19-24 Part III
CHAPTER 3	
301.1, 301.1.1	G1-24 Part V
TABLE 317.2(1)	M54-24 Part III
321 (New)	P19-24 Part III
401.1, 401.2, 401.3	G1-24 Part V
410.1	P19-24 Part III
501.1, 501.2	G1-24 Part V
601.1, 601.2, 601.3	G1-24 Part V
608.1	P19-24 Part III

INTERNATIONAL SWIMMING POOL AND SPA CODE	
TABLE 608.1	P19-24 Part III
608.2	P19-24 Part III
609,1	P19-24 Part III
609.2 through 609.9 (delete)	P19-24 Part III
701.1, 701.1.1, 701.2	G1-24 Part V
801.1, 801.2	G1-24 Part V
901.1, 901.2	G1-24 Part V
1001.1, 1001.2	G1-24 Part V
INTERNATIONAL WILDLAND URBAN INTERFACE CODE	
CHAPTER 2	
NONCOMBUSTIBLE MATERIAL	G12-24 Part V
CHAPTER 3	
301.1	G1-24 Part VIII
CHAPTER 4	
401.1	G1-24 Part VIII
CHAPTER 5	
501.1	G1-24 Part VIII
CHAPTER 6	
601.1	G1-24 Part VIII
APPENDIX A	
A103.2	E1-24 Part III
APPENDIX C	
TABLE C101.1	E1-24 Part III
APPENDIX G	
G101.3.2	E1-24 Part III

2024 COMMENTS TO THE RESULTS OF CAH #1
PROPOSED CHANGES TO THE 2024 INTERNATIONAL CODES

WUIC3-24

IWUIC: 403.4

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

403.4 Marking of roads. *Approved* signs or other *approved* notices shall be provided ~~and maintained for access roads and *driveways* to identify such roads and prohibit the obstruction thereof~~ to identify access roads. Approved signs shall be provided to prohibit the obstruction of access roads and driveways serving more than one building or structure. Required signs and notices shall be maintained and legible.

Reason: This proposal is intended to clarify this section, and indicate that it is not required to provide signs at driveways.

This current section contains several requirements in one sentence:

1. Signs identifying access roads and driveways
2. Signs to prohibit obstruction of access roads and driveways
3. Maintenance of signs.

This proposal splits the components apart and modifies it so that:

1. Signs are required to identify access roads. Signs identifying driveways are not required.
2. Signs are required to prohibit obstruction of access roads. Such signs are not required for driveways unless they serve more than one building or structure.
3. The required signs and notices must be legible and maintained.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This proposal will reduce the cost by eliminating the requirements for signs on driveways, and "NO OBSTRUCTION" signs on driveways serving individual structures. The cost per project is estimated to be $100.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost is based on the purchase of an average of two 4 x 4 redwood posts, paint and labor.

WUIC3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The intent is correct, but there is a conflict between the use of the defined term driveways and the number that is associated with it. In addition, there was objection to the use of the term structure in the requirement. (Vote: 11-2)

Individual Consideration Agenda

Comment 1:

IWUIC: 403.4, 403.4.1, 403.5 (New), 403.5.1 (New), 403.6, 403.5

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

403.4 Marking of roads. *Approved* signs ~~or other *approved* notices~~ shall be provided and maintained to identify access roads. ~~Approved signs shall be provided to prohibit the obstruction of access roads and driveways serving more than one building or structure. Required signs and notices shall be maintained and legible.~~

403.4.1 Sign construction. Road identification signs and supports shall be of noncombustible materials. Signs shall have minimum 4-inch-high (102 mm) reflective letters with $^{1}/_{2}$-inch (12.7 mm) stroke on a contrasting 6-inch-high (152 mm) sign. Road identification signage shall be mounted at a height of 7 feet (2134 mm) from the road surface to the bottom of the sign.

Add new text as follows:

403.5 Obstruction of access roads. Access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 403.3 shall be maintained at all times.

403.5.1 Marking. Where required by the code official, approved signs or other approved notices or markings shall be provided for access roads to prohibit the obstruction thereof. The signs or markings shall be maintained and be replaced or repaired when necessary to provide adequate visibility.

Revise as follows:

403.6 Address ~~markers~~identification. ~~Buildings shall have a permanently posted address, which~~New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Where the address identification is located on the building and cannot be viewed from the access road, a monument, pole or other sign shall be placed at each *driveway* entrance and be visible from both directions of travel along the road to identify the building. In all cases, the address shall be posted at the beginning of construction and shall be maintained thereafter, and the address shall be visible and legible from the road on which the address is located.

~~403.5~~ 403.8 Marking of fire protection equipment. Fire protection equipment and fire hydrants shall be clearly identified in a manner *approved* by the *code official* to prevent obstruction.

Reason: This item was disapproved at CAH 1 for lack of specifics on signs and coordination between the driveway and access road requirements. This comments has taken those issues into account.

Section 403.4 is confusing because its title is “marking of roads”, but the first sentence states the requirements apply to roads and driveways. To provide clarity, the section is revised to address access roads because driveway provisions are included in Section 403.2.

The first sentence of Section 403.4 has been revised to reinsert the requirement to maintain access road signs. The second sentence is added to specify when the installation of road signs must occur and correlates with the road sign requirements in IFC Section

505.2. Section 403.4.1 contains the specifications for road signs in the WUI areas. The requirement to not obstruct the access roads is relocated from the second sentence in Section 403.4 to new Section 403.5. This new section correlates with IFC Section 503.4.

Section 403.5.1 is the relocated provision for signs from the third sentence in Section 403.4. This section has also been revised to correlate with language in IFC Section 503.3. Even though the language in the IFC is specific to obstruction of fire lanes, the concept is the same. The current language in the IWUIC allows the code official to require signs as needed to prohibit obstruction of access roads, and the language in the IFC allows the code official to require signs as needed to prohibit obstruction of fire lanes.

Section 403.6 is retitled Address identification and revised. The revised text is consistent with IBC Section 502.1 and IFC Section 505.1 and states that the address requirement applies to new and existing buildings, because both the IFC and the IBC apply to new and existing buildings. The lettering requirements are included to match the IFC/IBC.

Section 403.5 is relocated to 403.8 since it did not fit within the requirements for access road signs.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will reduce the cost by eliminating the requirements for signs on driveways, and "NO OBSTRUCTION" signs on driveways serving individual structures.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost per project is estimated to be $100.

Comment (CAH2)# 696

WUIC11-24

IWUIC: G101.3.1

Proposed Change as Submitted

Proponents: Pierson Stoecklein, Frontline Wildfire Defense

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**G101.3.1 Exterior sprinkler systems.** Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value. Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the *defensible space*. In this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and fire-resistive plants that resist convection and radiated heat can accomplish the same purpose.~~

Reason: Outdated and inaccurate.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modifications incorporate an exterior wildfire sprinkler system into the code as optional equipment that can be installed on a structure at the discretion of the owner/s and the local code official. Because installation is not mandated, nor do the proposed modifications alter any construction requirements, the proposed modifications have no cost impact.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was that if something is being proposed to be deleted completely out of an appendix because there are specific issues with it, updated information related to the exterior sprinkler systems should be presented in the reason statement. (Vote: 13-0)

Individual Consideration Agenda

Comment 1:

IWUIC: G101.3.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

G101.3.1 Exterior wildfire sprinkler systems. Exterior wildfire sprinkler systems are designed to protect the structure and adjacent defensible space from flying embers. Exterior wildfire sprinkler systems consist of piping and devices arranged to discharge water, or a fire-extinguishing agent, on the exterior surfaces of a structure and the adjacent defensible space to pre-wet, hydrate and inhibit ignition from flying embers. Currently, there is no national standard for the design and installation of exterior wildfire sprinkler systems, however, there have been numerous installations which have proven their effectiveness in protecting against flying embers. A typical exterior wildfire sprinkler system has distribution piping with discharge devices located along the roof ridges and eaves, and possibly additional devices that are landscape mounted. These systems can be activated either manually or automatically. The advantages of exterior wildfire sprinkler systems is they increase the fuel moisture within the defensible space, and wet furniture, appliances, toys, etc. that the property owner has located within the defensible space. The IWUIC regulates the structure and permanent components within the defensible space, but there are many transient items that move in and out of the defensible space which are not regulated, especially at a residential structure. In those instances, the exterior wildfire sprinkler system is not only protecting the structure, it also alters the entire fuel load within the defensible space by wetting the furniture, umbrellas and any other items placed there by the homeowner.
Studies have shown that flying embers can travel miles ahead of the flame front during a wildfire. Exterior wildfire sprinkler systems are very effective in mitigating the ignition from these embers. Exterior wildfire sprinkler systems are not designed to fight the flame front as it crosses the property line and direct flame contact hits the structure; however, their effectiveness in protecting against flying embers has been clearly demonstrated.

Reason: The original proposal indicated that the language in the appendix was outdated and therefore should be deleted. While it is outdated, it should not be deleted, but rather updated. This comment intends to update the language regarding exterior wildfire sprinkler systems.

Exterior wildfire sprinkler systems have been used for several years and have been proven successful. These systems are not successful in combatting the actual flame front, however, they are extremely successful in mitigating the impact of flying embers. Flying embers can travel for miles in front of the flame front during a wildfire. These embers land on structures, decks or furniture and ignite those materials well ahead of the flame front and can cause a tremendous strain on fire resources.

The Insurance Institute for Business and Home Safety (IBHS) stated in a March 12, 2019 article that "During wildfires, as many as 90% of homes and buildings damaged or destroyed were first ignited by embers or other fires set by embers, and not the main wildland fire front. Yet many home and business owners do not take practical, affordable steps to help reduce the risk posed by these flying embers."

Exterior wildfire sprinkler systems are not required, but they are available, and they are installed. Providing the little bit of guidance in the appendix for the code user will be a benefit when the issue arises.

Bibliography: https://ibhs.org/ibhs-news-releases/embers-cause-up-to-90-of-home-business-ignitions-during-wildfire-events/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact because nothing is required.

Comment (CAH2)# 668

WUIC12-24

IWUIC: SECTION 405, 405.1, 405.2, 405.3, 405.4, 602.3 (New), 602.3.1 (New), 602.3.2 (New)

Proposed Change as Submitted

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION ~~405~~ 602
FIRE PROTECTION PLANS

~~**405.1**~~ **602.1 General.** ~~Where required by the *code official*, a *fire protection plan* shall be prepared.~~
The code official is authorized to require the owner or owner's authorized agent to provide a fire protection plan. The fire protection plan shall be prepared to determine the acceptability of fire protection and life safety measures designed to mitigate wildfire hazards presented for the property under consideration.

The fire protection plan shall be prepared by a registered design professional, qualified landscape architect, qualified fire safety specialist or similar specialist acceptable to the code official and shall analyze the wildfire risk of the building, project, premises or region to recommend necessary changes.

The code official is authorized to require a preliminary fire protection plan prior to the submission of a final fire protection plan.

~~**405.2**~~ **602.2 Content~~s~~.** ~~The plan shall be based on a site-specific wildfire risk assessment that includes considerations of location, topography, aspect, flammable vegetation, climatic conditions and fire history. The plan shall address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, *defensible space* and vegetation management.~~
The fire protection plan shall be based on a project-specific wildfire hazard assessment that includes considerations of location, topography, aspect, climatic and fire history.

The plan shall identify conformance with all applicable wildfire protection regulations.

The plan shall address fire department access, egress, road and address signage, water supply, and the applicable building codes and standards for wildfire safety. The plan shall identify mitigation measures to address the project's specific wildfire risk and shall include the information required in Sections 602.3 through 602.3.2.

Delete without substitution:

~~**405.3 Cost.** The cost of *fire protection plan* preparation and review shall be the responsibility of the applicant.~~

~~**405.4 Plan retention.** The *fire protection plan* shall be retained by the *code official*.~~

Add new text as follows:

602.3 Project information. . The final fire protection plan shall be reviewed and approved prior to start of construction.

602.3.1 Preliminary fire protection plan. When a preliminary fire protection plan is submitted, it shall include, at a minimum, the following:

1. Total size of the project.
2. Information on the adjoining properties on all sides, including current land uses, and if known, existing structures and densities, planned construction, natural vegetation, environmental restoration plans, roads and parks.
3. A map with all project boundary lines, property lines, slope contour lines, proposed structure foundation footprints, and proposed roads and driveways. The map shall identify project fuel modification zones and method of identifying the fuel modification zone boundaries.

602.3.2 Final fire protection plan. Final fire protection plan shall include items listed in Section 602.3.1 and the following:

1. A map identifying all proposed plants in the fuel modification zones with a legend that includes a symbol for each proposed plant species. The plan shall include specific information on each species proposed, including but not limited to:
   1.1. The plant life-form
   1.2. The scientific and common name
   1.3. The expected height and width for mature growth
2. Identification of irrigated and non-irrigated zones.
3. Requirements for vegetation reduction around emergency access and evacuation routes.
4. Identification of points of access for equipment and personnel to maintain vegetation in common areas.
5. Legally binding statements regarding community responsibility for maintenance of fuel modification zones.
6. Legally binding statements to be included in covenants, conditions and restrictions regarding property owner responsibilities for vegetation maintenance.

Reason: This proposal accomplishes two goals: 1) to relocate the Fire Protection Plan requirements to an appropriate location, and 2) enhance the provisions for the fire protection plan to provide guidance to those developing the fire protection plan.

The scope for Chapter 4 states that the chapter contains regulations for water supply and access. The Fire Protection Plan, currently in Section 405, does not fit under either of the Chapter 4 categories. Chapter 6 contains general requirements for fire protection. The provisions for a Fire Protection Plan fit more appropriately in Chapter 6, so they are mover to Section 602.

The California State Fire Marshal's office (SFM) workgroup 2020 was assembled to take on the task of creating a statewide approach for requiring a fire protection plan for any property under consideration to mitigate the wildfire hazards that may exist. This proposal is being submitted to the IWUIC, because the overall response from the design community has been positive. Nationwide consistency leads to further success in application of the code.

The proposal sets a framework for the elements of a fire protection plan to include. This proposal is a baseline of what a general plan shall consist of for evaluating the associated risks with a property and its location within a wildland-urban interface area. A proposed fire protection plan shall be approved before the start of any construction. This will ensure compliance with the requirements in this code. The enforcement of the protection plan starts at the beginning. The Fire Protection Plan is a document that can be referred to at any stage of a project.

Often, a preliminary Fire Protection Plan is submitted to help move a project along and save money for the owner during the different phases of construction. The preliminary Fire Protection Plan sets the groundwork and foundation for the boundaries of the project. This information is vital for planning departments and for cost analysis to be considered early on.

A final Fire Protection Plan includes all the requirements of the preliminary plan with the added landscaping details that may not have been completed in the early phase of a project. The code official will now have a complete document of the project and the planned fire protection to ensure the safety of the community, neighbors, and first responders. These documents and information will help first responders pre-plan for an incident.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice to require a fire protection plan is at the discretion of the code official. The design professional will typically incorporate any design criteria in the project cost. This is already a typical practice.

WUIC12-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The noted concerns were about the "qualified" person requirement and that these requirements should be in an appendix as recommended planning guidance. Furthermore, there were issues within the language of the preliminary and final lists regarding the application to different situations and locations. The desire to see the cost impact on this requirement in areas outside of California. (Vote: 11-2)

WUIC12-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 602, 602.1

Proponents: Adria Smith, CSG Engineers, California Fire Prevention Officers (adrias@csgengr.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

SECTION 602
FIRE PROTECTION PLANS

602.1 General. The code official is authorized to require the owner ~~or owner's authorized agent~~ to provide a fire protection plan. The fire protection plan shall be prepared to determine the acceptability of fire protection and life safety measures designed to mitigate wildfire hazards presented for the property under consideration.
The fire protection plan shall be prepared by a registered design professional, ~~qualified~~ approved landscape architect, ~~qualified~~ approved fire safety specialist or similar specialist ~~acceptable to the code official~~ and shall analyze the wildfire risk of the building, project, premises or region to recommend necessary changes.

The code official is authorized to require a preliminary fire protection plan prior to the submission of a final fire protection plan.

Reason: This proposal was disapproved by the committee as there were questions regarding the qualified professional. We are changing qualified to approved as well as deleting the owner's authorized agent as it is already defined in the code. There was also discussion among the committee to move this to an appendix, however, we feel this is reasonable to be placed in the body of the code for

consistency purposes among jurisdictions that have high fire areas.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds clarification, details and an enhancement to what is currently in the IWUIC. There is no related construction cost, however, there may be a cost borne by the applicant to have the plan developed depending on the scope of the project.

Comment (CAH2)# 543

WUIC13-24

IWUIC: 501.1

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

501.1 Scope. Buildings and structures shall be constructed in accordance with the *International Building Code* and this code. **Exceptions:**

1. Accessory structures ~~not exceeding 120 square feet (11 m^2) in floor area~~ and agricultural buildings ~~where~~ located ~~not less than~~ 50 feet (15 240 mm) or more from buildings containing habitable spaces are not required to comply with this code.
2. ~~Agricultural buildings not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~

Reason: Based on the current language, detached accessory structures can essentially be categorized into four groups. These groups are illustrated in Figure 1:

- Group A: Detached accessory structures with a floor area of 120 sq ft and less, located less than 50 feet of the primary structure.
- Group B: Detached accessory structures with a floor area greater than 120 sq ft, located less than 50 feet of the primary structure.
- Group C: Detached accessory structures with a floor area of 120 sq ft and less, located 50 feet or more from the primary structure.
- Group D: Detached accessory structures with a floor area greater than 120 sq ft, located at 50 feet or more from the primary structure.

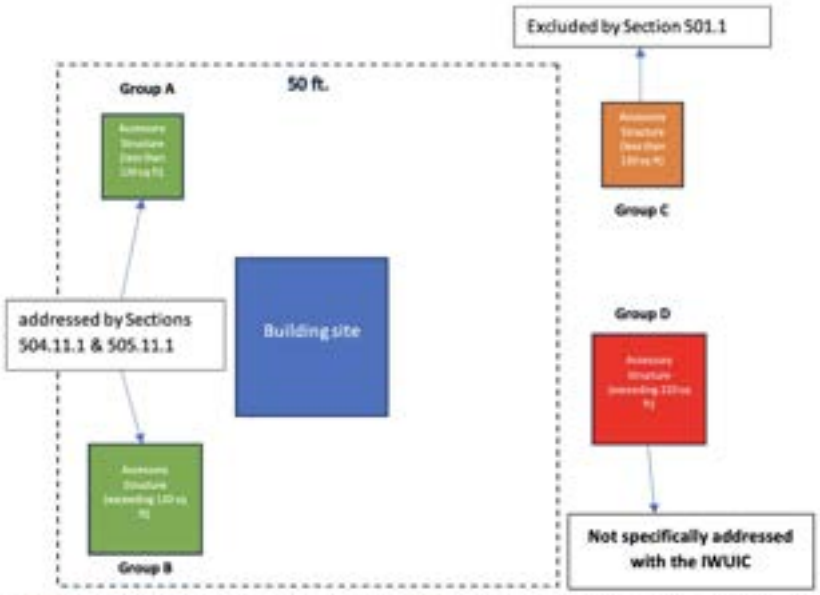

Figure 1. Detached accessory structures condition in 2024 IWUIC Scope.

Section 501.1 exempts Group C from the IWUIC, but all other structures must comply with the IBC and the IWUIC. Furthermore, Sections 504.11 and 505.11 of the IWUIC specifically address Group A and Group B detached accessory structures. Sections 504.11 and 505.11 require exterior walls of detached accessory structures located less than 50 feet from a building containing habitable space to be constructed consistent with the required construction of the exterior walls of primary structure. Group D (located 50 feet or more from the primary building and a floor area exceeding 120 square feet) is not specifically addressed by the IWUIC. The lack of specificity could lead

to uncertainty regarding the construction of Group D detached accessory structures. A strict reading of the charging paragraph of Section 501.1, would necessitate compliance with all the requirements detailed in both the IBC and the IWUIC for Group D structures. This would mean that Group D structures would have to meet all the requirements related to ignition resistance class 1 or 2, resulting in construction that is more stringent than Group A and B structures even though Group D structures pose a much lower risk. This is counterintuitive.

504.11 Detached accessory structures. Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials approved for not less than 1-hour fire-resistance-rated construction, heavy timber, log wall construction, or constructed with approved noncombustible materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

504.11.1 Underfloor areas. Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6.

Exception: The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code*.

Figure 2. Detached accessory structures requirements for IR Construction classes 1.

To address this issue, the proposed language recommends exempting all detached accessory structures located more than 50 feet away from a habitable building from the scope of IWUIC. This suggestion is supported by the findings of structure separation experiments conducted by the IBHS and NIST. These experiments indicate that when the separation distance between structures exceeds 50 feet, the risk of conflagration and structure ignition is significantly lower [1-3]. Chapter 7A of the California Building Code also includes similar requirements in Section 710A.3 (Figure 3) and this change will align these two codes from this perspective [4].

> ***710A.3 Where required.*** *Miscellaneous structures that require a permit, and accessory buildings of any size, when separated from an applicable building on the same lot by a distance of less than 3 feet (914 mm), shall comply with Section 710A.3.1. Accessory buildings that are greater than 120 square feet (11.15 m²), when separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall comply with Section 710A.3.2.*
>
> *When required by the enforcing agency, miscellaneous structures that require a permit, and accessory buildings that are 120 square feet (11.15 m²) or less, when separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm), shall comply with either Section 710A.3.4 or Section 710A.3.3, respectively.*
>
> *No requirements shall apply to accessory buildings or miscellaneous structures when located 50 feet (15 240 mm) or more from an applicable building on the same lot.*

Figure 3. 2022 California Building Code, Chapter 7A, Section 710A, Accessory Buildings and Miscellaneous Structures [4].

Bibliography:

1. Maranghides, A., Link, E. D., Nazare, S., Hawks, S., McDougald, J., Quarles, S. L., & Gorham, D. J. (2022). *WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology*. Department of Commerce. National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.2205

2. Maranghides, A., Nazare, S., Hedayati, F., Gorham, D., Link, E., Hoehler, M., ... & Walton, W. (2022). *Structure Separation*

Experiments: Shed Burns without Wind. National Institute of Standards and Technology, US Department of Commerce. https://doi.org/10.6028/NIST.TN.2235

3. Maranghides, A., Nazare, S., Butler, K. M., Johnsson, E. L., Link, E., Bundy, M., ... & Frievalt, F. (2023). *NIST Outdoor Structure Separation Experiments (NOSSE) with Wind.* https://doi.org/10.6028/NIST.TN.2253

4. 2022 California Building Code, California code of regulation, Title 24, Part 2 (Volumes 1 & 2) with Jan 2023 Errata, Section 710A.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 or less. This proposed code change provides clarity for detached accessory structures with floor areas exceeding 120 square feet and located 50 feet or more from the main building. Existing language currently requires these detached accessory structures to comply with the IWUIC. This proposed code change will exclude these structures from these requirements. Consequently, detached accessory structures exceeding 120 square feet in floor area and located more than 50 feet away from the main building will no longer need to comply with all the stipulated conditions of IR Class 1 or 2.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will result in a decrease in the cost of construction for detached accessory structures that have a floor area exceeding 120 square feet and are located 50 feet or more from a building containing habitable space.

WUIC13-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The proposal does not take into account accessory structure fire loading above 120 square feet and no technical substantiation was given for how that affects the wildfire hazard to buildings next to it within the 50-foot range. Also, there was concern that this is based on experience in California. However, the experience in California seems to also call for the defensible space around the structures, which does not get addressed in the proposal. Additional concern was noted about striking the 120 square feet area that could require an automatic sprinkler system for certain structures over 120 square feet in area required by the building code and those structures could pose a risk to the wildland. Finally, there was a little concern with the definition of accessory structure regarding the specific text of “occupancy other than a habitable building.” (Vote: 13-0)

WUIC13-24

Individual Consideration Agenda

Comment 1:

IWUIC: 501.1

Proponents: Milad Shabanian, Insurance Institute for Buisness & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

501.1 Scope. Buildings and structures shall be constructed in accordance with the *International Building Code* and this code. **Exceptions:** Accessory structures and agricultural buildings located 50 feet (15 240 mm) or more from buildings containing habitable spaces are not required to comply with this chapter ~~code~~.

Reason: This comment addresses the committee's concerns regarding original language. During CAH#1, an opponent argued that this language would disrupt the enforcement of defensible space requirements for structures and create issues with sprinkler system requirements. This is while the only intention is to clarify that the exception only applied to the "construction" of detached accessory structures in WUI areas as the 2024 IWUIC is not specifically clear on this. The committee recommended deleting the final part of the exception and ending it at "containing habitable spaces." to remove the confusion caused by "comply with this code". However, removing the last part of the proposed change could introduce additional confusion about what specifically these structures are being exempted from. The new language in this comment clarifies that detached accessory structures that are located 50 feet or more from a building containing habitable space, are not required to comply with the construction criteria in Chapter 5 of the IWUIC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 or less.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposed code change provides clarity for detached accessory structures with floor areas exceeding 120 square feet and located 50 feet or more from the main building. Existing language currently requires these detached accessory structures to comply with the IWUIC. This proposed code change will exclude these structures from these requirements. Consequently, detached accessory structures exceeding 120 square feet in floor area and located more than 50 feet away from the main building will no longer need to comply with all the stipulated conditions of IR Class 1 or 2. This will result in a decrease in the cost of construction for detached accessory structures that have a floor area exceeding 120 square feet and are located 50 feet or more from a building containing habitable space.

Comment (CAH2)# 20

WUIC16-24

IWUIC: SECTION 202, 501.4 (New), 501.4.1 (New), 501.4.2 (New), 503.2.1, ASTM Chapter 07 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**NONCOMBUSTIBLE**. As applied to building construction material means a material that, in the form in which it is used, is either one of the following:~~

1. ~~Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E136 shall be considered noncombustible within the meaning of this section.~~
2. ~~Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over 1/8 inch (3.2 mm) thick, which has a flame spread index of 50 or less. Flame spread index as used herein refers to a flame spread index obtained according to tests conducted as specified in ASTM E84 or UL 723.~~

~~"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classified as noncombustible that is subject to increase in combustibility or flame spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.~~

Add new text as follows:

501.4 Noncombustibility tests. The tests indicated in Section 501.4.1 shall serve as criteria for acceptance of building materials. The term noncombustible does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

501.4.1 Testing. Materials required to be noncombustible shall be tested in accordance with ASTM E136 and pass the test. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136. **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

501.4.2 Additional requirements. The term noncombustible does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to the requirements of ASTM E136.

Revise as follows:

503.2.1 Noncombustible material. Material shall comply with the requirements for noncombustible materials in Section 501.4 ~~definition of *noncombustible* materials in Section 202~~.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E2652-2018	Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

It has been a recent practice in ICC codes that definitions should not contain requirements but just concepts. This proposal does exactly that.

This proposal deletes the definition of noncombustible from section 202 of the IWUIC and adds the exact requirements for noncombustibility from section 703 of the IBC into a new section. This makes the requirements for noncombustible materials consistent with those in the IBC (with the same language). Additionally, this proposal retains the added requirements from the IWUIC regarding surface finish materials and materials close to flues or heating appliances.

This proposal is also consistent with other ICC codes and with the requirements of ASTM E136. Note that materials can be noncombustible in accordance with ASTM E136 and yet exhibit some limited flaming.

This proposal also deletes a definition with requirements and incorporates the requirements into the section of the code that deals with Special Building Construction Regulations (Chapter 5) in the General section.This proposal also revises section 503.2.1 that sends the code user to section 202 for the “requirements” got noncombustible materials, now sending the user to the new section 501.4

Comment: Since neither “flues, heating appliances and sources of high temperature” nor “interior finish” are regulated by the IWUIC, a simpler solution would be not to add proposed new section 501.4.2.

See the following from other ICC codes.

1. The IBC does not have a definition for noncombustible material but section 703.3 states as shown below, which is exactly what this proposal does. It is based on

2. The IRC defines as follows: “NONCOMBUSTIBLE MATERIAL. A material that passes ASTM E136.”

3. The IFC does not have a definition.

4. The IMC defines as follows: “NONCOMBUSTIBLE MATERIAL. A material that passes ASTM E136.”

If a material is tested to ASTM E136 it will pass the test requirements even if it ignites (a bit) and has some burning and some mass loss (see the actual language below). Therefore, saying (as the IWUIC says now in item 1) that “no part will ignite or burn” is inconsistent with many materials that pass ASTM E136.

Two different pieces of equipment are used to pass ASTM E136. The first one (now called Option A) is the equipment that was always in ASTM E136. The second one, called Option B, uses the equipment in ASTM E2652 but the acceptance criteria are the same for both pieces of equipment and are in section 15 of ASTM E136. The language from the IBC and ASTM E136 is shown below.

IBC section 703 states as follows (and a change will be proposed to add the words "and pass the test"):

703.3 Noncombustibility tests. The tests indicated in Section 703.3.1 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Types I, II, III and IV construction. The term “noncombustible” does not apply to the *flame spread* characteristics of *interior finish* or *trim* materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or *flame spread* beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

ASTM E136 states as follows when it requires that a material pass the test:15. Report

15.1 Report the material as passing the test if at least three of the four test specimens tested meet the individual test specimen criteria detailed either in 15.2 or in 15.3. The three individual test specimens do not need to meet the same individual test specimen criteria.

15.2 If the weight loss of an individual test specimen is 50 % or less, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 15.2.1 through 15.2.3 are met:

15.2.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.

15.2.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.

15.2.3 There is no flaming from the test specimen after the first 30 s.

15.3 If the weight loss of an individual test specimen exceeds 50 %, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 15.3.1 through 15.3.3 are met:

15.3.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.

15.3.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.

15.3.3 There is no flaming from the test specimen at any time during the test.

15.4 Report whether the apparatus for Option A or the apparatus for Option B was used.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not have any cost impact. It simply moves a definition with requirements into an appropriate section in the chapter that deals with materials.

WUIC16-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
2024 International Wildland Urban Interface Code

501.4.1 Testing.
Materials required to be noncombustible shall ~~be tested in accordance with~~pass ASTM E136~~ and pass the test~~. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 ~~using~~ and meet the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Committee Reason: The committee stated that the reason for the approval of the modification was that it clarifies the testing criteria better. The committee stated that the reasons for the approval of the proposal with the modification were: The proposal deletes the definition that contains technical requirements in it and then relocates the requirements for noncombustible materials that are consistent with the IBC with the same language into new sections in Chapter 5. Additionally, it also retains the added requirements from the WUIC regarding surface finish, materials, and materials close to the flues and heating appliances. (Vote: 13-0)

WUIC16-24

Individual Consideration Agenda

Comment 1:

IWUIC: 503.2.1, 501.4, 501.4.1, 501.4.2

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Wildland Urban Interface Code

503.2.1 Noncombustible material. Material shall comply with the requirements for noncombustible materials in Section 503.2.1.1 ~~501.4~~.

~~**501.4**~~ **503.2.1.1 Noncombustibility tests.** The tests indicated in Section503.2.1.1.1 ~~501.4.1~~ shall serve as criteria for acceptance of building materials. The term noncombustible does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

~~**501.4.1**~~ **503.2.1.1.1 Testing.** Materials required to be noncombustible shall pass ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 and meet the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

~~**501.4.2**~~ **503.2.1.1.2 Additional requirements.** The term noncombustible does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to the requirements of ASTM E136.

Reason: This comment is intended to bring more uniformity to the various building materials referenced in the IWUIC. The change only moves the Noncombustibility test requirements of noncombustible (NC) materials from Section 501 (General) to Section 503 (Ignition Resistant Construction and Material) to improve consistency within the code. Currently, the IWUIC is the only I-Code that lists some material's and assembly's requirements in a General Section, while other materials and assemblies are listed in Section 503. This inconsistency has caused significant confusion among code users. Providing a reference to noncombustible materials in Section 503.2.1

with a pointer to Section 501.4 complicates the code, especially for new users. This concern was raised in the first action committee hearing. The proponents of WUIC16-24 argue that a "noncombustible material" is a generic type of concept that is used in different sections of different chapters, therefore, it should be located in the general section of code. According to a review performed by IBHS, there is no other instance within any of the other I-Codes supporting this argument. Additionally, the original proposal as written, would add "testing requirements" for noncombustible materials in the general section of Chapater 5 and the reference to "noncombustible materials" would remain in Section 503.

As part of its mission to enhance community resiliency and safety, the Insurance Institute for Business and Home Safety (IBHS), launched the Wildfire Prepared (WFP) Home designation in 2022. To receive this designation, homeowners must provide information about their homes and construction materials. The IBHS product team reviews these requests and addresses technical questions. During this process, it became evident that ordinary homeowners and new code users are particularly confused around noncombustible materials and where they are required. WUIC16-24, without this proposed comment, will add to this confusion by sending users to another location for what qualifies as a noncombustible material. This comment does not proposing any technical change. It simply relocates the requirements for noncombustible materials to section 503, which is the appropriate place for building material and assemblies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal relocates a construction material to a more appropriate section and refines the code language to ensure its seamless integration in the new location without proposing any technical changes resulting in no cost impact.

Comment (CAH2)# 51

WUIC18-24

IWUIC: 501.3, SECTION 503, 503.1, 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3, 503.3 (New)

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**501.3 Fire-resistance-rated construction.** Where this code requires 1-hour *fire-resistance-rated construction*, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263.~~ ~~**Exceptions:**~~

1. ~~The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the International Building Code.~~
2. ~~The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the International Building Code.~~

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ CONSTRUCTION AND ~~MATERIAL~~ MATERIALS

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required for the ignition-resistant construction classes ~~to be ignition-resistant materials~~ shall comply with the requirements of ~~Section 503.2~~this section.

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.4.

503.2.1 Noncombustible material. Material shall comply with the definition of *noncombustible* materials in Section 202.

503.2.2 Fire-retardant-treated wood. Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

503.2.3 Fire-retardant-treated wood roof coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Ignition-resistant building material. Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^{1}/_{8}$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3. **Exception:** Materials composed of a combustible core and a noncombustible exterior

covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

503.2.4.1 Flame spread. The material shall exhibit a flame spread index not exceeding 25.

503.2.4.2 Flame front. The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

503.2.4.3 Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.4.3.1 through 503.2.4.3.3, as applicable to the materials and conditions of use.

503.2.4.3.1 Evaluation requirements for weathering. Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898.

503.2.4.3.2 Wood-plastic composite materials. Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

503.2.4.3.3 Plastic lumber materials. Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Add new text as follows:

503.3 Fire-resistance-rated construction. Where this code requires 1-hour fire-resistance-rated construction, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263 for exposure from the exterior side of the assembly **Exceptions:**

1.	The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the *International Building Code* for exposure from the exterior side of the assembly.
2.	The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the *International Building Code* for exposure from the exterior side of the assembly.

Reason: This proposal relocates a construction method to a more appropriate section and refines the code language to ensure its seamless integration in the new location. In the 2024 IWUIC, Section 501.3, onwhich addresses the qualification of fire-resistance-rated construction, is located in Section 501, the general section of Chapter 5. Typically, these general sections focus primarily on the scope and purpose of each chapter. Listing construction methods within Section 501 is not consistent with the other general sections of the IWUIC. For clarification purposes, this proposal relocates Section 501.3 to new Section 503.3. Section 503 is specifically dedicated to matters related to construction and materials. The title of section 503 is proposed to be changed from ignition-resistant construction and material to construction and material to construction and materials. The charging paragraph in Section 503.1 has been refined to ensure that the relocation of Section 501.3 to new Section 503.3 will be correlated with this relocation.

Background

In 2012, Section 501.3 was introduced to IWUIC as part of WUIC2-9/10 [1]. Then, in 2015, exceptions 1 and 2 were incorporated into this section via a proposal brought forth by WUIC1-13 [2].

Bibliography:

1. Marcelo M. Hirschler, GBH International, representing American Fire Safety Council, WUIC2–09/10, https://www.iccsafe.org/wp-content/uploads/IWUIC1.pdf

2. Jason Thompson, National Concrete Masonry Association, representing Masonry Alliance for Codes and Standards, WUIC1-13, https://www.iccsafe.org/wp-content/uploads/11-IWUIC.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is strictly a clarification. Relocating existing Section 501.3 to new Section 503.3 pertaining to construction and material will not result in a technical changes to the code. As a result, the proposal will not have an impact on construction costs, either positively or negatively.

WUIC18-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was that although the change relocates the requirements to the right section, there is some work that needs to be done based upon the proponent's request to bring it back to the committee. (Vote: 12 -0)

WUIC18-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 503, 503.1, 501.3

Proponents: Milad Shabanian, Insurance Institute for Buisness & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ CONSTRUCTION AND MATERIAL

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ~~ignition-resistant materials~~ *ignition-resistant building materials* shall comply with the requirements of Section 503.2. Where this code requires fire-resistance rated construction, fire-resistance

ratings shall be determined in accordance with Section 503.4.

~~**501.3**~~ **503.4 Fire-resistance-rated construction.** Where this code requires ~~1 hour~~ *fire-resistance-rated construction*, the fire-resistance rating of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263. **Exceptions:**

1. The fire-resistance rating of building elements, components or assemblies based on the prescriptive designs prescribed in Section 721 of the International Building Code.
2. The fire-resistance rating of building elements, components or assemblies based on the calculation procedures in accordance with Section 722 of the International Building Code.

Reason: In addition to the reason provided for original code change proposal this comment tries to address two issues:

This comment deletes an unnecessary term used in charging paragraph of section 501.3 referring to 1 hour fire resistance rated construction, and adds a sentence to charging paragraph of Section 503.1, change the proposed section number to 503.4 and aligns this change with WUIC17-24 which got approved in CAH#1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is strictly a clarification. Relocating existing Section 501.3 to new Section 503.3 pertaining to construction and material will not result in a technical changes to the code. As a result, the proposal will not have an impact on construction costs, either positively or negatively.

Comment (CAH2)# 52

WUIC20-24

IWUIC: TABLE 503.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION CLASSIFICATION[a]

DEFENSIBLE SPACE[ea]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[ab]	Nonconforming[ec]	Conforming[ab]	Nonconforming[ec]	Conforming[ab]	Nonconforming[ec]
Less than required by Table 603.2	IRClass 2	IRClass 1	IRClass 1	IR 1 N.C. Rated[d]	IR 1 N.C. Class 1[d]	Not PermittedNP
ConformingComplies with Table 603.2	IRClass 3	IRClass 2	RIClass 2	IRClass 1	IRClass 1	IR 1 N.C.Class 1[d]
1.5 × Conforming150% or more of distance required in Table 603.2	Not Required NR	IRClass 3	IRClass 3	IRClass 2	IRClass 2	IRClass 1

NP = Not Permitted; NR = Not Required; Class 1 = Ignition-resistant construction in accordance with Section 504; Class 2 = Ignition-resistant construction in accordance with Section 505; Class 3 = Ignition-resistant construction in accordance with Section 506.

a. ~~Access shall be in accordance with Section 403.~~ Distance of defensible space provided on all sides of structure as required in Table 603.2.

b. ~~Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~ A conforming water supply complying with Section 404.

~~IR 1 = Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 = Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 = Ignition-resistant construction in accordance with Section 506.~~

~~N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

c. ~~Conformance based on Section 603.~~ A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

d. ~~Conformance based on Section 404.~~ In addition to Class 1 construction, the exterior walls shall comply with any of the following:

1. Exterior walls having a fire-resistance rating of 1 hour or more with a noncombustible exterior wall covering.
2. Exterior walls constructed of heavy timber members.
3. Exterior walls of log wall construction.

~~e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal intends to clarify the application of Table 503.1.

IR 1 through IR 3 are replaced with Class 1 through Class 3. This is consistent with the terminology in the charging section, Section 503.1, and Sections 504, 505 and 506.

Nonconforming and conforming under defensible space is clarified as to what the conformance is referencing—the width of defensible space, or the distance from the structure.

The “IR 1 N.C.” term is replaced with “rated”. Footnote d specifies that rated construction consists of Class 1 ignition-resistant construction and the protection of the exterior walls is increased to one of the 3 options in Footnote d.

For additional clarification, the designation “NP” is intended to mean that any construction in areas with these risk factors is not permitted.

The designation “NR” is intended to mean that ignition resistant construction is not required for exterior walls. All other applicable requirements still apply.

There are three separate code changes dealing with IWUIC Table 503.1. Attached PDF shows the end goal for Table 503.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is an editorial clairification that does not impact cost. See also the proponent’s reason statement.

WUIC20-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification:
2024 International Wildland Urban Interface Code
Revise as follows:

TABLE 503.1 ~~IGNITION-RESISTANT~~ WUI CONSTRUCTION CLASSES ~~CLASSIFICATION~~

DEFENSIBLE SPACE[a]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply		Water Supply		Water Supply	
	Conforming[b]	Nonconforming[c]	Conforming[b]	Nonconforming[c]	Conforming[b]	Nonconforming[c]
Less than required by Table 603.2	Class 2	Class 1	Class 1	~~Rated~~ Class 1[d]	Class 1[d]	NP
Complies with Table 603.2	Class 3	Class 2	Class 2	Class 1	Class 1	Class 1[d]
150% or more of distance required in Table 603.2	NR	Class 3	Class 3	Class 2	Class 2	Class 1

	NP = Not Permitted; NR = Not Required; Class 1 = ~~Ignition-resistant~~ construction in accordance with Section 504; Class 2 = ~~Ignition-resistant~~ construction in accordance with Section 505; Class 3 = ~~Ignition-resistant~~ construction in accordance with Section 506.
a.	Distance of defensible space provided on all sides of structure as required in Table 603.2.
b.	A conforming water supply complying with Section 404.
c.	A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.
d.	In addition to Class 1 construction, the exterior walls shall comply with any of the following: 1. Exterior walls having a fire-resistance rating of 1 hour or more with a noncombustible exterior wall covering. 2. Exterior walls of heavy timber construction ~~constructed of heavy timber members~~. 3. Exterior walls of log wall construction.

Committee Reason: The committee stated that the reason for the approval of first modification was that it was appropriate to change the terminology from heavy timber member to heavy timber construction. The committee stated that the reason for the approval of the second modification was that it deleted ignition resistance in the footnotes and in the title. The committee stated that the reasons for the approval of the proposal with the modifications were: It clarifies the intent by replacing ignition resistant IR 1 through 3 with Class 1 through 3, making it now consistent with the charging section of Section 503.1 and Sections 504, 505 and 506. (Vote: 13-0)

WUIC20-24

Individual Consideration Agenda

Comment 1:

IWUIC: TABLE 503.1

Proponents: Stephen Skalko, Stephen V. Skalko, P.E. & Associates LLC, Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Wildland Urban Interface Code

TABLE 503.1 WUI CONSTRUCTION CLASSES

DEFENSIBLE SPACE[a]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply		Water Supply		Water Supply	
	Conforming[b]	Nonconforming[c]	Conforming[b]	Nonconforming[c]	Conforming[b]	Nonconforming[c]
Less than required by Table 603.2	Class 2	Class 1	Class 1	Class 1[d]	Class 1[d]	NP
Complies with Table 603.2	Class 3	Class 2	Class 2	Class 1	Class 1	Class 1[d]
150% or more of distance required in Table 603.2	NR	Class 3	Class 3	Class 2	Class 2	Class 1

DEFENSIBLE SPACE	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply		Water Supply		Water Supply	
	Conforming	Nonconforming	Conforming	Nonconforming	Conforming	Nonconforming

NP = Not Permitted; NR = Not Required; Class 1 = Construction in accordance with Section 504; Class 2 = Construction in accordance with Section 505; Class 3 = Construction in accordance with Section 506.

a. Distance of defensible space provided on all sides of structure as required in Table 603.2.

b. A conforming water supply complying with Section 404.

c. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

d. In addition to Class 1 construction, the exterior walls shall comply with any of the following:

1. Exterior walls having a fire-resistance rating of 1 hour or more with a noncombustible exterior wall covering.
2. Exterior walls of heavy timber construction <u>having a fire resistance rating of 1-hour or more</u>.
3. Exterior walls of log wall construction <u>having a fire resistance rating of 1-hour or more</u>.

Reason: Since walls of heavy timber construction and log walls are listed as equivalent alternatives to a 1-hour fire rated wall with a noncombustible exterior wall covering, it is implied they would also meet the 1-hour fire resistance. For consistency this change makes clear all three types of walls should have a fire resistance rating of 1-hour or more.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since heavy timber walls and log walls are considered equivalent alternate exceptions to a 1-hour fire rated wall with noncombustible exterior wall covering, one has to assume these walls also need to have at least a 1-hour fire resistance. Clarifying this in the code will not increase costs.

Comment (CAH2)# 524

WUIC22-24

IWUIC: 402.2.2, 404.1, 503.1, TABLE 503.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

402.2.2 Water supply. Individual structures hereafter constructed or relocated into or within *wildland-urban interface areas* shall be provided with a ~~conforming~~ water supply in accordance with Section 404. **Exception~~s~~:**

1. ~~Structures constructed to meet the requirements for the class of ignition-resistant construction specified in Table 503.1 for a nonconforming water supply.~~
2. ~~2~~ 1. Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

404.1 General. ~~Where provided in order to qualify as a conforming water supply for the purpose of Table 503.1 or as required for new subdivisions in accordance with Section 402.1.2, an~~ An *approved* water source shall have an adequate water supply for the use of the fire protection service to protect buildings and structures from exterior fire sources or to suppress structure fires within the *wildland-urban interface area* of the jurisdiction in accordance with this section. **Exception:** Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant building materials shall comply with the requirements of Section 503.2.

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION~~[a]~~

Portions of table not shown remain unchanged.

DEFENSIBLE SPACE~~[c]~~[a]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	~~Water Supply[b]~~		~~Water Supply[b]~~		Water Supply[b]	
	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~
Nonconforming	IR 2	~~IR 1~~	IR 1	~~IR 1~~ ~~N.C.~~	IR 1 N.C.	~~Not Permitted~~
Conforming	IR 3	~~IR 2~~	IR 2	~~IR 1~~	IR 1	~~IR 1~~ ~~N.C.~~
1.5 × Conforming	Not Required	~~IR 3~~	IR 3	~~IR 2~~	IR 2	~~IR 1~~

~~a. Access shall be in accordance with Section 403.~~

IR 1 = Ignition-resistant construction in accordance with Section 504; IR 2 = Ignition-resistant construction in accordance with Section 505; IR 3 = Ignition-resistant construction in accordance with Section 506.

~~b.~~ ~~Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~

~~IR 1 =~~ ~~Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 =~~ ~~Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 =~~ ~~Ignition-resistant construction in accordance with Section 506.~~

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

~~c~~ a. Conformance based on Section 603.

~~d.~~ ~~Conformance based on Section 404.~~

~~e.~~ ~~A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The footnote reference to Section 403 (Access) is removed as not necessary. Compliance with Section 403 is required and a footnote "pointer" is redundant.

The footnote reference to Section 404 (Water Supply) is deleted in accordance with deletion of the Water Supply references in the TableWater supply in accordance with Section 404 should be provided for all new construction. As a tool for fire suppression and structure hazard mitigation during a WUI fire, firefighters may not be available to protect structures, so in that instance water supply would not reduce the fire risks or be an effective mitigation. Removing water supply puts the emphasis for protection of structures from wildland fire onto the constriction of the building to be ignition resistant and the defensible space.

There are three separate code changes dealing with IWUIC Table 503.1. The PDF attached shows the end goal for Table 503.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Chapter 5 and Table 503.1 are the requirements for newly built structures and subdivisions in areas regulated by the IWUIC. Accordingly, a compliant water supply should always be provided or addressed through approved alternative methods or materials as allowed by the code. The application of this Table as currently written allows for a reduction in required IR Construction materials when the water supply complies with what is already required by this code,

The cost of construction will be increased based on this proposal as compared to the cost reduction (allowance) that is currently provided. That cost will be based on the difference of IR 3 construction vs. IR 2 or IR 2 vs IR1.

Summarized from ChatGPT: The cost of adding fire mains for a subdivision can vary widely depending on several factors such as the size of the subdivision, the existing infrastructure, local building codes and regulations, terrain, distance to the nearest water source, and the type of fire suppression system being installed. This provides a general estimate. Installing fire mains typically involves laying underground water pipes to supply water for firefighting purposes. Costs may include excavation, piping materials, valves, hydrants, backflow prevention devices, labor, permits, engineering/design fees, and any necessary road or sidewalk repairs.

The cost of installing fire mains for a subdivision could range from $50,000 to $200,000 or more per mile of pipe, depending on various

factors. Based upon the information obtained from ChatGPT an estimate of cost per structure has been developed. This estimate assumes a relatively straightforward installation with minimal obstacles. So assuming a subdivision of 20 house subdivision with generous spacing is about .1 mile distance. $5000-$20,000 for the subdivision based upon that distance. For each home an overall cost of $250-$1000 per structure. However, since they will have a conforming water supply as currently shown in the table they will not be required to upgrade the ignition resistant construction type.

It's important to note that these costs can vary significantly based on local conditions, regulations, and specific project requirements.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of construction will be increased based on this proposal as compared to the cost reduction (allowance) that is currently provided. That cost will be based on the difference of IR 3 construction vs. IR 2 or IR 2 vs IR1. That cost would typically not exceed 1-2% of overall construction cost, but is variable based on the size of the building and the choice of building materials chosen to comply.

WUIC22-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The action taken on WUIC21 that added the IR 3 requirement with a 1.5 conforming defensible space in a moderate hazard location. The concern over the requirements for existing buildings and homes. It was noted that the non-conforming column would be useful to the code official in challenging situations when you are building in a location that has an existing infrastructure. Additionally, the impact on existing homes that could put a homeowner in a situation where they may never be able to do a renovation or do anything on their own because they cannot comply with the water supply requirements. (Vote: 9-4)

WUIC22-24

Individual Consideration Agenda

Comment 1:

IWUIC: 402.2.2, 404.1, 503.1, TABLE 503.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

402.2.2 Water supply. Individual structures ~~hereafter~~ newly constructed ~~or relocated into or~~ within *wildland-urban interface areas* shall be provided with a water supply in accordance with Section 404. **Exception:**

1. Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

404.1 General. An *approved* water source shall have an adequate water supply for the use of the fire protection service to protect buildings and structures from exterior fire sources or to suppress structure fires within the *wildland-urban interface area* of the jurisdiction in accordance with this section. **Exception:** Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

Revise as follows:

503.1 General. New ~~Buildings~~ buildings and structures ~~hereafter~~ constructed~~, modified or relocated into or~~ within *wildland-urban interface areas* shall meet the construction requirements in accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively. Materials required to be ignition-resistant building materials shall comply with the requirements of Section 503.2.

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION

DEFENSIBLE SPACE[a]	FIRE HAZARD SEVERITY		
	Moderate Hazard	High Hazard	Extreme Hazard
			Water Supply[b]
Nonconforming	IR 2	IR 1	IR 1 N.C.
Conforming	IR 3	IR 2	IR 1
1.5 × Conforming	Not Required	IR 3	IR 2

.

IR 1 = Ignition-resistant construction in accordance with Section 504; IR 2 = Ignition-resistant construction in accordance with Section 505; IR 3 = Ignition-resistant construction in accordance with Section 506.

.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

a. Conformance based on Section 603.

Reason: The only change was to the language regarding existing structures to make it clear that the the original change was only applicable to new construction. These changes to the original proposal address the committee's comments.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The need for a sanctioned water supply will increase the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Will vary depending on the size and type of water supply.

Estimated Life Cycle Cost Impact:

n/a

Estimated Life Cycle Cost Impact Justification (methodology and variables):

n/a

Comment (CAH2)# 255

WUIC23-24

IWUIC: TABLE 503.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Wildland Urban Interface Code

Revise as follows:

TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]

DEFENSIBLE SPACE[c]	FIRE HAZARD SEVERITY					
	Moderate Hazard		High Hazard		Extreme Hazard	
	Water Supply[b]		Water Supply[b]		Water Supply[b]	
	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]	Conforming[d]	Nonconforming[e]
Nonconforming	IR 2	IR 1	IR 1	IR 1 N.C.	IR 1 N.C.	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 N.C.
~~1.5 × Conforming~~	~~Not Required~~	~~IR 3~~	~~IR 3~~	~~IR 2~~	~~IR 2~~	~~IR 1~~

a. Access shall be in accordance with Section 403.

b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.

IR 1 = Ignition-resistant construction in accordance with Section 504.

IR 2 = Ignition-resistant construction in accordance with Section 505.

IR 3 = Ignition-resistant construction in accordance with Section 506.

N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.

c. Conformance based on Section 603.

d. Conformance based on Section 404.

e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.

Reason: This proposal eliminates the last row in Table 503.1. The deleted row only applies where a structure provides a defensible space distance that is 150% or more of a conforming defensible space. Section 503.1 states that the requirements in Table 503.1 only apply to new construction or new structures. Therefore, existing structures which may not have any ignition-resistant construction are not affected by this table.

But for new construction, this provision is at minimum vague and confusing; and then it creates a situation which is nearly impossible to properly enforce for the life of the structure. The provision in the table is based on 150% times a conforming defensible space, and Footnote c directs the user to Section 603. However, this is not clear whether the provision applies to defensible space being 150% of the width required in Table 603.2; or if it means the trees within the defensible space are separated 150% of the distance required in Section 603.2.2; or both.

As far as enforcing this provision for the life of the structure, consider Structure X in the WUI. Structure X is located in the Moderate

Hazard area with a conforming water supply. Structure X provides a 150% increase in the distances required in both Table 603.2 and Section 603.2.2, so at the time of construction ignition-resistant building materials are not required. This design complies with Table 503.1 at the time of construction. Three years later, the code official is conducting an inspection of the area for maintenance of the defensible space. The code official will not be aware of the fact that the structure was required to maintain a 45' defensible space, so the code official will require the 30' defensible space requirement similar to all other structures in the Moderate Hazard area.

The only way to determine whether an owner must provide 150% of defensible space is to go back to the original plans and research the applicable code at the time of construction, then determine if the construction of the structure complies or not. While this is a valid avenue for enforcement, we all know that this amount of effort will not be put into every inspection. In fact, I would not be surprised if it is not put into **any** inspection. Most likely, the inspector will simply require the conforming distance as he/she did on every adjacent neighbor. In this fashion, it is an easier inspection; it looks acceptable; and the inspector moves on to next property.

Each year during the spring and early summer, a single WUI inspector can perform hundreds of inspections daily. If the information for a specific lot is not readily available, the provision will be lost. In doing so, the structure now should have been constructed of Class 3 ignition-resistant construction.

Additionally, Structure A is located in the Moderate Hazard area, but was allowed to be constructed with no ignition-resistant construction, not even a fire-resistance-rated roof. The rating of the roof covering is required for Classes 1, 2 and 3 ignition-resistant construction, but Dwelling A did not have to comply since 150% of the defensible space was provided. It is a frequent occurrence that structures are ignited ahead of the fire front by burning embers pushed ahead of the fire and landing on the rooftop. But Dwelling A does not have a rated roof. The 45' defensible space protects from radiant heat and direct flame impingement. The roof is not protected, and Dwelling A is lost when the roof ignites from burning embers.

Some may argue that Dwelling A will be saved because there is a conforming water supply. However, even the best water supply is of no benefit when there are no firefighters available to utilize it. When there are multiple structures needing protection, the Incident Commander will decide where to deploy the firefighters because there are more structures than firefighters and fire engines. Structure A has a 45' defensible space, while others only have the required 30' distance. It is likely that it will be decided that Structure A is less vulnerable because of the increased defensible space and firefighters will be sent to other structures. The water supply does not improve the survivability of Structure A at all in this case.

The concept to allow credit for 150% of the defensible space is flawed and difficult to maintain throughout the life of the structure. The entire row and this allowance should be removed from the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This proposal will increase the cost of construction, but only for structures which would have benefited from providing the 150% increase in the defensible space requirements. However, the construction increase will be offset by the one-third reduction in labor for annual pruning and trimming of the vegetation within the defensible space. Utilizing ignition-resistant construction materials will increase the construction cost for the exterior walls, deck and roof by 15%

- Exterior walls: For typical wood-framed exterior walls with standard materials such as 2x4 or 2x6 studs, plywood or OSB sheathing, house wrap, siding (vinyl, wood, or fiber cement), insulation, and interior drywall, the cost can range from $15 to $30 per square foot of wall area. Therefore resulting in an increase ranging from $1.5 dollars to $3.00 a square foot.
- Decks: The cost of building a deck can vary widely based on factors such as size, materials (pressure-treated wood, composite decking, etc.), design complexity, and site conditions. On average, the cost of building a deck can range from $20 to $50 per square foot. Therefore, resulting in an increase ranging from $2.0 dollars to $5.00 a square foot.
- Roofs: Roofing costs depend on factors such as the type of roofing material (asphalt shingles, metal, tile, etc.), roof slope, complexity of the roof design, and regional labor rates. On average, the cost of roofing can range from $3 to $10 per square foot for materials and installation. Therefore, resulting in an increase ranging from $0.30 dollars to $1.00 a square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost estimates for exterior walls, decks and roofs were obtained from ChatGPT.

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was the desire to retain the 1.5 conforming defensible space row in the table, which was noted to be a viable construction option. (Vote: 9-4)

WUIC23-24

Individual Consideration Agenda

Comment 1:

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Submitted

Reason: This code change should be approved as submitted.

Even though there are other proposals that affect this table, if they are not approved, this proposal should be approved. If those other proposals are approved and this line is deleted elsewhere, then that is acceptable. But do not let this row remain in the table in the code. It is an enforcement nightmare.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 717

WUIC26-24

IWUIC: 503.2.4

Proposed Change as Submitted

Proponents: David Bueche, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Wildland Urban Interface Code

Revise as follows:

503.2.4 Ignition-resistant building material. Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^{1}/_{8}$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3. The use of paints, coating, stains, or other surface treatments is not an approved method of protection as required in this section. **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

Reason: Efforts are being made by manufacturers seeking approval for painted, coated, stains, or other surface-treated wood that require continuous maintenance in lieu of ignition-resistant building materials. This proposed addition will clarify that paints, coating, stains, and other types of products with vulnerable surface coatings are not approved for use as ignition-resistant building materials in the wildland-urban interface (WUI).

This language already exists in the International Building Code in Section 2303.2.2 for fire-retardant-treated wood (FRTW), which is one of the categories of ignition-resistant building materials in IWUIC (503.2.2). It is also in the 2021 IRC, Section R802.1.5.2. This language is in NFPA 1140 Standard for Wildland Fire Protection for FRTW and is also in Chapters 7A and 23 of the California Building Code.

Finally, note that the required testing referenced in 503.2#1 would require ignition-resistant building materials to undergo the same testing as FRTW.

Adding this proposed language to 503.2 adds clarity and conformity to codes affecting WUI communities and ensures that any ignition-resistant material will perform as well as FRTW.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code is silent on use of coatings and clarification is important.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The opposition to adding a prohibition in the code for these methods. There is no technical substantiation provided in the reason statement and it is being proposed to be added to the wrong section. (Vote: 12-1)

Individual Consideration Agenda

Comment 1:

IWUIC: 503.2, 503.2.2, 503.2.5 (New), 503.2.4.1, 503.2.4.2, 503.2.5.3 (New); IBC: [BF] 2303.2.3

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); David Bueche, Hoover Treated Wood Products, Hoover Treated Wood Products (dbueche@frtw.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Wildland Urban Interface Code

503.2 Ignition-resistant building material. Ignition-resistant building materials shall comply with any one of the requirements in Section 503.2.1 through 503.2.5 ~~503.2.4~~.

503.2.2 Fire-retardant-treated wood. Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

Add new text as follows:

503.2.5 Fire-retardant coated wood. Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The material shall bear identification showing the fire test results. The material, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.5.1 through 503.2.5.3.

503.2.5.1 Flame spread. The fire-retardant coated wood material shall exhibit a flame spread index not exceeding 25, on both the front and back faces.

503.2.5.2 Flame front. The fire-retardant-coated wood material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test, on both the front and back faces.

Add new text as follows:

503.2.5.3 Weathering. The fire-retardant coated wood material shall demonstrate that there is no change in performance under conditions of use by the following procedure. The fire-retardant coated wood material shall be evaluated before and after weathering (including exposure to temperature, moisture and ultraviolet radiation) in accordance with Method A “Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing” in ASTM D2898 and both tests shall meet the performance requirements of Sections 503.2.5.1 and of 503.2.2.

2024 International Building Code

[BF] 2303.2.3 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required in this section.

Reason: The key issue that this comment addresses is that any fire-retardant coated wood material intended for use as an ignition resistant building material in the code must be able to provide the appropriate fire protection before and after weathering, something that

the present code does not provide.

During the discussion of the proposal four issues were raised as the reason the proposal was disapproved, as follows. First, it was pointed out that the new sentence proposed for addition to section 503.2.4 should not have been added into that section but should have been added to section 503.2.2. Adding the proposed new sentence to Section 503.2.2 is unnecessary as that section (on FRTW) refers directly to IBC section 2303.2. One of the subsections of IBC 2303.2 is section 2303.2.2 which states as shown in the next paragraph, so that it includes already the proposed new language.

"IBC 2303.2.2 Other means during manufacture. For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The
treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an approved method of protection as required in this section."

Second, it was pointed out that weathering is essential for any ignition resistant building material and that the code only includes weathering for fire-retardant-treated wood, plastic lumber and wood-plastic composite, but not for fire-retardant coated wood. This comment adds a section specifically for fire-retardant coated wood and that new section (503.2.5) includes the requirements to meet the fire test and the requirements for weathering, similar to the requirements for weathering of fire-retardant-treated wood.

Third, it was pointed out that a prohibition for the use of fire-retardant coated materials would disallow future progress, in spite of the fact that evidence was presented (including information regarding a study by NIST (NIST Technical Note 2094, "Effect of Fire-Retardant Coatings and Accelerated-Weathering on the Flammability of Wood-Based Materials in Wildland-Urban Interface (WUI) Communities", by Laura Dubrulle, Mauro Zammarano, and Rick D. Davis; May 12th, 2020, https://doi.org/10.6028/NIST.TN.2094) that none of the existing wood coating materials exhibit sufficient permanence to be able to be used when exposed to the normal weather conditions in WUI areas (including rain). The NIST report is attached.

Fourth, it was pointed out that materials for use in the IWUIC code are all materials intended for use when exposed to the weather (including rain), so that permanence under exposure conditions is essential.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarifies that all ignition resistant building materials for use in the IWUIC areas must be equally dealt with in terms of weathering.

Comment (CAH2)# 66

WUIC27-24

IWUIC: SECTION 202 (New), 504.2, 504.2.1 (New), 504.8, 505.2, 505.2.1 (New), 505.8, 506.2, 506.2.1 (New), 506.5 (New), NFPA (New), UL Chapter 07 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new definition as follows:

EXTERIOR GLAZED DOOR. An operable opening in the building envelope that contains fixed glazing.

Revise as follows:

504.2 Roof assembly. Roofs shall have a *roof assembly* that complies with a Class A rating when tested in accordance with ASTM E108 or UL 790. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*. **Exceptions:**

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Add new text as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8.

Revise as follows:

504.8 Exterior glazing. Exterior windows, window walls and *exterior glazed doors* ~~glazed door~~ having a glazed area of 25 percent or greater of the door area, windows within exterior doors, and skylights shall be ~~tempered glass,~~ one of the following:
1. Multilayered ~~*multilayered*~~ *glazed panels* containing at least one tempered pane or dome~~.~~; or
2. Glass ~~glass~~ block units; or
3. Have ~~have~~ a minimum fire protection rating of ~~not less than~~ 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

505.2 Roof assembly. Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Add new text as follows:

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 505.8.

Revise as follows:

505.8 Exterior glazing. Exterior windows, window walls and ~~glazed doors~~ *exterior glazed doors* having 25 percent or greater of the door area, windows within exterior doors, and skylights shall be ~~tempered glass,~~ one of the following:
1. *Multilayered ~~multilayered~~ glazed panels containing at least one tempered panel or dome~~,~~ ; or*
2. Glass ~~glass~~ block units; or
3. Have ~~have~~ a fire protection rating of ~~not less than~~ 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test..

506.2 Roof assembly. Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be fire-stopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.

Add new text as follows:

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 506.5.

506.5 Exterior Glazing. Exterior windows, window walls and e*xterior glazed doors* having a glazed area of 25 percent or greater of the door area, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* contain at least one tempered pane; or
2. Glass block units; or
3. Have a minimum fire protection rating of 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

257-2022 Standard on Fire Test for Window and Glass Block Assemblies

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

9-2009 Fire Tests of Window Assemblies, with Revisions through March 2020

Reason: This proposal provides a definition for “exterior glazed door” to clearly explain this is an exterior door with fixed glazing, commonly referred to as a door lite. Within the Class fire-ignition requirements, the minimum percentage of glazing that would trigger certain requirements is then provided in the sections 504.8, 505.8 and 506.8. Fixed glazing relates to the glazing itself and does not imply that the door is not operable. Further, a glazed door includes various types of doors, including sliding glass doors, side hinged doors, or folding door systems.

In all WUI classes of construction, this proposed requires a least one pane of tempered glass, which has been shown to be effective in the performance to resist fire intrusion. It also adds the NFPA 257 and UL 9 when testing to the fire protection rating but for exempting the hose stream test, which is also exempted in the IBC. The markings to determine NFPA or UL compliance are found within the IBC. The proposal then adds the same exterior glazing requirements Class 3 WUI construction, which currently has no exterior glazing requirements.

The remaining editorial changes are intended to provide needed clarity to prevent misinterpretations of what is required. Those changes are as follows:

1. Adds a pointer under roof assembly for skylights, tubular daylighting devices and sloped glazing, in order to prevent any confusion that

these products fall under roof assembly compliance.

2. Makes formatting edits to the exterior glazing sections so it is clear that one of the three options must be chosen.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC since 2003, will increase costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. Multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. However, this proposal will increase the cost per lite of glass (minimum of on tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project.

Based upon a typical window size and a house with 20 windows and a typical cost range of $700-$1,000 per installed window, this would be about a $2,800-$4,000 total increase.

Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles.

The proposal provides for options to meet the exterior glazing requirements laid out. If the NFPA or UL testing option is chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above cost estimate was determined from: https://www.forbes.com/home-improvement/windows/floor-to-ceiling-windows-cost/

For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance.

One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to either the UL or NFPA standard; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

WUIC27-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was the need for additional revisions to be made including the referenced standards in the modifications. (Vote: 12-0)

WUIC27-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 202, 504.2.1 (New), 504.8, 505.2.1, 505.8, 506.2.1, 506.5 (New), NFPA (New), UL Chapter 07 (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

~~EXTERIOR~~ GLAZED DOOR. An ~~operable opening in the building envelope that contains fixed glazing.~~exterior door having a glazed area of 25 percent or greater of the door.

Add new text as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8.

Revise as follows:

504.8 Exterior glazing. Exterior windows, window walls, ~~and *exterior glazed doors* having a glazed area of 25 percent or greater of the door area~~, windows within exterior doors, and skylights shall be one of the following:

1. Multilayered *glazed panels* containing at least one tempered pane
2. Glass block units
3. Have a minimum fire door or fire window fire protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL 10B, or UL 10C, or in accordance with NFPA 257 or UL9, as appropriate.

1. ~~Multilayered *glazed panels* containing at least one tempered pane or dome; or~~
2. ~~Glass block units; or~~
3. ~~Have a minimum fire protection rating of 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test..~~

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 505.8.

505.8 Exterior glazing. Exterior windows, window walls, ~~and *exterior glazed doors* having 25 percent or greater of the door area~~, windows within exterior doors, and skylights shall be one of the following:

1. Multilayered *glazed panels* containing at least one tempered pane
2. Glass block units

3. Have a fire door or fire window fire protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL 10B, or UL 10C, or in accordance with NFPA 257 or UL9, as appropriate.

~~1. *Multilayered glazed panels containing at least one tempered panel or dome* ; or~~

~~2. Glass block units; or~~

~~3. Have a fire protection rating of 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test..~~

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 506.5.

Add new text as follows:

506.5 Exterior Glazing. Exterior windows, window walls, *glazed doors* , windows within exterior doors, and skylights shall comply with one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane
2. Glass block units
3. Have a minimum fire door or fire window fire protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL 10B, or UL 10C, or in accordance with NFPA 257 or UL9, as appropriate.

Add new standard(s) as follows:

NFPA

NFPA
National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471
USA

252-2022	Standard Methods of Fire Tests of Door Assemblies
257-2022	Standard on Fire Test for Window and Glass Block Assemblies

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

9-2009	Fire Tests of Window Assemblies, with Revisions through March 2020
10A - 2009	Tin Clad Fire Doors—with Revisions through July 20, 2018
10B-2008	Fire Tests of Door Assemblies—with Revisions through May 2020

Reason: The Committee disapproved this proposal because of the need for additional revisions, including several technical deficiencies in the fire test standards referenced in the original proposal. This Public Comment corrects those deficiencies.

First, the definition is updated to align how "glazed door" is defined in the industry and in other codes, including the CA code. Having the 25% included is core to the definition, as it makes it clear that if less than that, it is not a glazed door.

The original proposal only referenced NFPA 257, the fire test applicable to fire windows, when it should have also referenced NFPA 252 for fire doors. Additionally, the original proposal inaccurately provided for NFPA 257 fire testing without the hose stream test when NFPA 257 does not permit testing without the hose stream portion of the test.

This Public Comment adds reference to NFPA 252, the test for fire doors, which permits testing without the hose stream, and it corrects the inaccurate hose stream reference to NFPA 257. Finally, the Public Comment includes reference to the correct alternate UL test standards for both NFPA 252 and NFPA 257.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC since 2003, will increase costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. Multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. However, this proposal will increase the cost per lite of glass (minimum of on tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project. Based upon a typical window size and a house with 20 windows and a typical cost range of $700-$1,000 per installed window, this would be about a $2,800-$4,000 total increase. Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles. The proposal provides for options to meet the exterior glazing requirements laid out. If any of the NFPA or UL testing options are chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above cost estimate was determined from: https://www.forbes.com/home-improvement/windows/floor-to-ceiling-windows-cost/ For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance. One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to any of the UL or NFPA standards; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

Comment (CAH2)# 267

Comment 2:

IWUIC: 504.2.1, 505.2.1, 506.2.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

504.2.3 ~~504.2.1~~ Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8.

505.2.3 ~~505.2.1~~ Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 505.8.

506.2.3 ~~506.2.1~~ Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 506.5.

Reason: ARMA's interest in this proposal is the addition of pointers for skylights into roof assembly Sections 504.2, 505.2, and 506.2. The reason statement of the original proposal indicates the pointers are added "to prevent any confusion that these products fall under roof assembly compliance." However, making the pointer the first subsection within the Roof Assembly section calls attention to skylights

rather than reducing confusion. This comment moves the new skylight pointers to be the last subsection in the Roof Assembly sections. Doing so reduces the implication that skylights are the most important subsection.

Note that the renumbered subsections are shown as "point 3." This is to coordinate with WUIC30-24, which was approved as modified during the first Committee Action Hearing. WUIC30-24 adds a new subsection "point 2" in 504.2, 505.2, and 506.2. The intention is for the skylight pointer subsections to be the last sections within the respective Roof Assembly sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment rearranges sections without making any technical changes. There will be no impact on the cost of construction.

Comment (CAH2)# 286

WUIC28-24

IWUIC: SECTION 202 (New), 504.2.1 (New), 504.8, 505.2.1 (New), 505.8, 506.2.1 (New), 506.5 (New), NFPA (New), UL Chapter 07 (New)

Proposed Change as Submitted

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com); Cesar Lujan, Window & Door Manufacturers Association (clujan@wdma.com)

2024 International Wildland Urban Interface Code

Add new definition as follows:

GLAZED DOOR. Exterior door having a glazed area of 25 percent or greater of the area of the door.

Add new text as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8

Revise as follows:

504.8 Exterior glazing. Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be one of the following:~~tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.~~

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new text as follows:

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 505.8

Revise as follows:

505.8 Exterior glazing. Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following: ~~tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.~~

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new text as follows:

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 506.5.

506.5 Exterior glazing. Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane.

2. Glass block units.

3. Have a fire protection rating of not less than 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

257--22 Standard on Fire Test for Window and Glass Block Assemblies

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

9--2009 Fire Tests of Window Assemblies--with Revisions through March 2020

Reason: This proposal adds a definition for a glazed door in order to provide needed clarity and consistency in what is considered a glazed door, for the purposes of the exterior glazing requirements found in Class 1 and 2, as well as the new Class 3 requirements being proposed. This definition stems from the California Code.

In Class 1 and 2 ignitition-resistant construction, this proposed change eliminates a single pane tempered glass, which has been shown to not be as effective in fire barrier performance. It also adds the NFPA 257 Standard on Fire Test for Window and Glass Block Assemblies and UL 9 Fire Tests of Window Assemblies Standard when testing to the fire protection rating, but for exempting the hose stream test that is included in both standards. The hose stream test is also exempted in section 716.2.5.3 of the IBC. The markings to determine NFPA or UL compliance are found within the IBC, as both of these standards are already referenced and utilized in the IBC.

The proposal then adds the same revised exterior glazing requirements for Class 1 and 2 to Class 3 ignitition-resistant construction, which currently has no exterior glazing requirements. These Class revisions stem from the California Building and Residential Code and requirements in their Wildland Urban Interface Chapter.

The remaining changes are intended to provide needed clarity to prevent misinterpretations of what is required. Those changes are as follows:

- Adds a new subsection under Class 1, 2 and 3 roof assembly sections for skylights, tubular daylighting devices and sloped glazing. This pointer is to prevent any confusion that these products fall under roof assembly compliance.
- Makes formatting edits to the exterior glazing sections so it is clear that ONE of the now three options must be chosen.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC sine 2003, will increase the costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. However, multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. This proposal will increase the cost per lite of glass (minimum of one tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project.

Based upon a typical window size and a house with 20 windows and a typical cost range of $700-$1,000 per installed window, this would be about a $2,800-$4,000 total increase.

Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles.

The proposal provides for options to meet the exterior glazing requirements laid out. If the NFPA standard or UL standard testing option is chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above cost estimate was determined from: https://www.forbes.com/home-improvement/windows/floor-to-ceiling-windows-cost/

For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance.

One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to either the UL 9 or NGPA 257 standard; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

WUIC28-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was the same as the reason for WUIC27. (Vote: 11-0)

WUIC28-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 202, 504.2.1, 504.8, 505.2.1, 505.8, 506.2.1, 506.5, NFPA (New), UL Chapter 07 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com); Cesar Lujan, Window & Door Manufacturers Association (clujan@wdma.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

GLAZED DOOR. Exterior door having a glazed area of 25 percent or greater of the area of the door.

Revise as follows:

504.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8

504.8 Exterior glazing. Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a minimum fire door or fire window protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL10B, or UL10C, or in accordance with NFPA 257 or UL 9, as appropriate ~~and shall be exempt from the hose stream test~~.

505.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 505.8

505.8 Exterior glazing. Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a minimum fire door or fire window protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL10B, or UL10C, or in accordance with NFPA 257 or UL 9, as appropriate ~~and shall be exempt from the hose stream test~~.

506.2.1 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 506.5.

506.5 Exterior glazing. Exterior windows, window walls and *glazed doors*, windows within exterior doors, and skylights shall be one of the following:

1. *Multilayered glazed panels* containing at least one tempered pane.
2. Glass block units.
3. Have a minimum fire door or fire window protection rating of not less than 20 minutes when tested without the hose stream test in accordance with NFPA 252, UL10B, or UL10C, or in accordance with NFPA 257 or UL 9, as appropriate ~~and shall be exempt from the hose stream test~~.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

252--22	Standard Methods of Fire Tests of Door Assemblies

Add new text as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

10B--2008	Fire Tests of Door Assemblies--with Revisions through May 2020

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

10C--2016 Positive Pressure Fire Tests of Door Assemblies--with Revisions through May 2021

Reason: The Committee disapproved this proposal because of several technical deficiencies in the fire test standards referenced in the original proposal. This Public Comment corrects those deficiencies.

The original proposal only referenced NFPA 257, the fire test applicable to fire windows, when it should have also referenced NFPA 252 for fire doors. Additionally, the original proposal inaccurately provided for NFPA 257 fire testing without the hose stream test when NFPA 257 does not permit testing without the hose stream portion of the test.This Public Comment adds reference to NFPA 252, the test for fire doors, which permits testing without the hose stream, and it corrects the inaccurate hose stream reference to NFPA 257. Finally, the Public Comment includes reference to the correct alternate UL test standards for both NFPA 252 and NFPA 257.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Eliminating the option of allowing single-pane tempered that has been in the IWUIC since 2003, will increase costs for manufacturers shifting to provide multilayered glazed panels with at least one tempered pane. Multilayered glazed panels are readily available in the industry and being installed to meet other code requirements. However, this proposal will increase the cost per lite of glass (minimum of on tempered pane); and, when that cost is aggregated to the overall cost of the window, it is estimated to be at least 20% more than annealed glass and the actual cost depends on the size and complexity of the fenestration project. Based upon a typical window size and a house with 20 windows and a typical cost range of $700-$1,000 per installed window, this would be about a $2,800-$4,000 total increase. Further, multilayered glazed panels (i.e. insulating glazing), with at least one tempered pane is a makeup that is not designed for meeting full safety glazing requirements in hazardous locations. This new makeup for the IWUIC is available from only some manufacturers that have been meeting California Code requirements for the last five California code cycles. The proposal provides for options to meet the exterior glazing requirements laid out. If any of the NFPA or UL testing options are chosen, there will be an increase in cost associated with this testing because it is not currently a common approach that manufacturers utilize.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above cost estimate was determined from: https://www.forbes.com/home-improvement/windows/floor-to-ceiling-windows-cost/

For manufacturers who have not been manufacturing product for California requirements, the cost will be higher to comply with multilayered glazed panels with at least one tempered pane than for those manufacturers who have been producing this product at a greater rate for California compliance. One of the options to meet the exterior glazing requirements will be an increase in cost for manufacturers to proceed with the testing to any of the UL or NFPA standards listed; however, many may choose to utilize the other options that are currently in the IWUIC, eliminating that cost increase.

Comment (CAH2)# 228

Comment 2:

IWUIC: 504.2.1, 505.2.1, 506.2.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

504.2.3 ~~**504.2.1**~~ **Skylights.** Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 504.8

505.2.3 ~~**505.2.1**~~ **Skylights.** Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 505.8

506.2.3 ~~**506.2.1**~~ **Skylights.** Skylights, including tubular daylighting devices and sloped glazing shall comply with Section 506.5.

Reason: ARMA's interest in this proposal is the addition of pointers for skylights into roof assembly Sections 504.2, 505.2, and 506.2. The reason statement of the original proposal indicates the pointers are added "to prevent any confusion that these products fall under roof assembly compliance." However, making the pointer the first subsection within the Roof Assembly section calls attention to skylights rather than reducing confusion. This comment moves the new skylight pointers to be the last subsection in the Roof Assembly sections. Doing so reduces the implication that skylights are the most important subsection.

Note that the renumbered subsections are shown as "point 3." This is to coordinate with WUIC30-24, which was approved as modified during the first Committee Action Hearing. WUIC30-24 adds a new subsection "point 2" in 504.2, 505.2, and 506.2. The intention is for the skylight pointer subsections to be the last sections within the respective Roof Assembly sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment rearranges sections without making any technical changes. There will be no impact on the cost of construction.

Comment (CAH2)# 285

WUIC36-24

IWUIC: SECTION 202 (New), 504.5, 504.5.1 (New), 504.5.2 (New), 504.5.1

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Add new definition as follows:

EXTERIOR SURFACES. Weather-exposed surfaces.

EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

Revise as follows:

504.5 Exterior walls. Where defensible space conforms to the provisions of Section 603, exterior~~Exterior~~ walls of buildings or structures shall be constructed in accordance with Section 504.5.1 or Section 504.5.2.
Where defensible space does not conform to the provisions of Section 603, exterior walls of buildings or structures shall be constructed in accordance with Section 504.5.1 and Section 504.5.2.

Flashing shall be applied in accordance with Section 504.5.3. ~~one of the following methods:~~

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~Heavy timber or *log wall construction*.~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials complying with Section 503.2 on the exterior side.~~

~~Such material shall extend from the top of the foundation to the underside of the roof sheathing.~~

Add new text as follows:

504.5.1 Exterior wall assemblies. Exterior wall assemblies of buildings or structures shall have a minimum of 1-hour fire-resistance-rating, rated for exposure on the exterior side in accordance with Section 501.3.
The exposed bottom edge of combustible sheathing shall be protected with noncombustible building material with a minimum assigned protection time of 40 minutes, or the sheathing shall be inset to rest directly on the foundation.

Exception: The bottom edge of exposed combustible sheathing is permitted to be covered with corrosion-resistant metal flashing provided there is an air gap of at least 1 inch between the metal flashing and the bottom edge of the combustible sheathing. Both legs of the flashing shall be attached a maximum of 6 inches (152.4 mm) on center.

504.5.2 Exterior surfaces. The exterior surfaces shall be constructed in accordance with one or more of the followings:

1. Approved noncombustible materials complying with Section 503.2.1.

2. Fire-retardant-treated wood complying with Section 503.2.2.

3. Ignition-resistant building materials complying with Section 503.2.4.

Revise as follows:

~~**504.5.1**~~ **504.5.3 Flashing.** A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

Reason: Table 503.1 requires the use of Ignition Resistant Construction Class 1 (IR1) in situations where defensible space is nonconforming. In such scenarios during a wildfire, the exterior walls of the structure may be exposed to embers, radiation heat, and direct flame exposures. Accordingly, the exterior wall assembly needs to provide a minimum resistance against these exposures. intermediate-scale, and full-scale experiments performed at the IBHS Research Center illustrate that the current requirements do not provide the needed resistance against wildfire exposures. Section 504.5 provides 5 alternatives for construction of exterior walls:

1. Materials approved for not less than 1-hour fire-resistance-rated (FRR) construction on the exterior side.
2. Approved noncombustible materials.
3. Heavy timber or log wall construction.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant materials complying with Section 503.2 on the exterior side. According to section 503.2 ignition-resistant materials include the followings: noncombustible, FRTW and IR building materials.

There is a notable inconsistency in the current alternatives for exterior walls of this class of construction, particularly in terms of resistance against fire impingement and flame spread. The first method permits 1-hour FRR construction when tested in accordance with ASTM E119 or UL 263. In this test the wall assembly is tested without a siding material, and it is possible to have 1-hour FRR wall assembly with different combustible siding materials and different rates of flame spread on the exterior surface. Therefore, there is significant risk of fire spreading to other sections of the building, including eaves, roofs, and openings (vents, windows, doors), with less restrictive fire resistance requirements. Figure 1 displays a moment captured during the wind-driven fire spread tests conducted at the IBHS research center at the separation distance of 20 ft. The "source structure" comprises metal and wooden sheds containing 15, 6-A wood cribs (UL 711 standard cribs). The “target structure” is a one-and-a-half-story residential structure featuring an open eave, double-pane tempered windows, and a one-hour-rated exterior wall. The cladding consists of a combination of combustible engineered wood siding material on left side and fiber cement panels on the right. Both structures face a nominal wind speed of 35 mph, and the thermal impact on the target building is observed using heat flux gauges, thermocouples, and cameras. As can be seen in Figure 1, about 10 minutes after a point ignition inside the shed, the target building ignited and within the next few seconds, the fire could spread on the surface causing severing damage to the eaves, vents, and windows. The test was terminated after a minute due to safety reasons. In this test the target structure had 1-hr FRR from exterior. The dark gray siding was fiber cement board (noncombustible siding) while the light gray siding was engineered wood (combustible) siding material.

Figure 1. a. The test setup for wind driven building to building fire spread tests. The target building has an hour fire resistant rated wall assembly.

Figure 1. b. ignition of the combustible siding.

Figure 1. c. fire spread on the surface and flames touching all components in about 10 seconds on left side.

Figure 1. d. after suppression; severe damage can be seen on all components on the left-side.

Another concern with 1-hour FRR alone is the wide range of wall assemblies that can meet the performance requirements of ASTM E119. Figure 2 shows two different wall assemblies that achieve 1-hr FRR from either side.

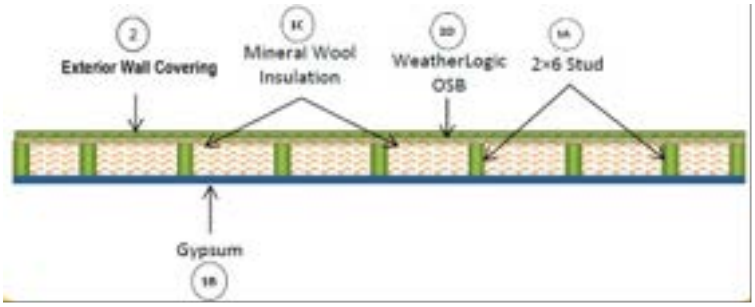

Figure 2. *a.* 1-hour fire resistance rated exterior wall with *OSB sheathing panel on the exterior side [1].*

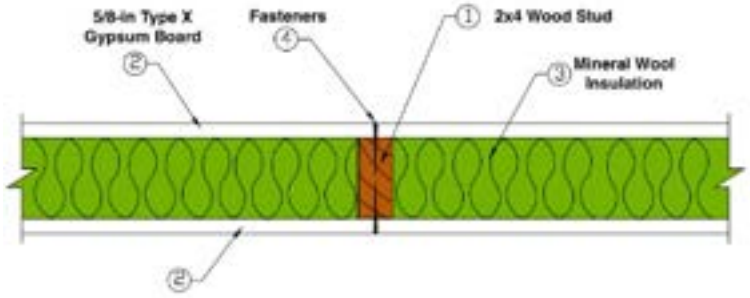

Figure 2. b. 1-hour fire resistance rated exterior wall with *Type X gypsum board on the exterior side [2].*

While Figure 2a and 2b both qualify as 1-hr FRR construction, the assembly in Figure 2a is particularly vulnerable to wildfire exposure at the base because combustible sheathing material is used in the assembly. Figure 3 shows a series of fire tests conducted at the IBHS Research Center where different configurations of 1-hour fire-resistant rated assembly with combustible engineered wood siding material were exposed to a small fire at the base. Figure 3a is about a typical 1-hour fire-resistant rated assembly constructed with OSB sheathing material. In this test the OSB sheathing material is exposed from bottom. During this experiment, the fire spread across the surface of the combustible exterior siding and impinged inside the wall cavity because of the exposed bottom surface of OSB sheathing material. Figure 3b shows a 1-hour fire-resistant rated assembly constructed with noncombustible sheathing material in accordance with Figure 2b. In this experiment the fire only ignited the combustible engineered wood siding material and did not impinge inside the wall assembly.

Figure 3. a. 1-hr FRR assembly with unprotected OSB Sheathing material at the bas3. Photo curtesy by Milad Shabanian, IBHS.

Figure 3. b. 1-hr FRR assembly with noncombustible sheathing material. Photo curtesy by Milad Shabanian, IBHS.

Item 2 of Section 504.5 permits the use of noncombustible materials. While this construction method provides comprehensive protection against fire spread, it does not specifically address the fire resistance rating and protection against fire impingement. Item 3 permits the use of heavy timber or log wall construction suggesting they offer similar protection. However, Section 602.4.4 in the IBC requires exterior walls of heavy timber construction to be noncombustible, which arguably aligns more appropriately with Item 2 or constructed

with FRTW or cross-laminated timber. In case that the exterior walls constructed with cross-laminated timber and heavy timber elements the exterior surface of such element shall be protected with: FRTW, Gypsum board or noncombustible materials.

In contrast, log wall construction technically aligns more with Item 1. According to Section 303 of ICC 400, 6-inch-thick logs can provide a 1-hour fire resistance against fire impingement. However, given their combustible nature, log wall constructions may exhibit varying fire spread rates, influenced by the different flame spread indices associated with various wood species.

Items 4 and 5 do not explicitly address fire impingement. These methods are only intended to limit the flame spread index of exterior surfaces. Figure 4 illustrates two typical exterior wall assembly constructed with ignition-resistant building material. Figure 4a is a typical exterior wall assembly protected on the exterior with noncombustible metal siding and Figure 4b is a wall protected with noncombustible fiber cement lap siding material.

Figure 4. a. Typical exterior wall assemblies constructed on the exterior with noncombustible metal siding. Photo curtesy by Milad Shabanian, IBHS.

Figure 4. b. Typical exterior wall assemblies constructed on the exterior with noncombustible fiber cement siding material. Photo curtesy by Milad Shabanian, IBHS.

An additional inconsistency in the IWUIC is that requirements for exterior wall construction are the same for IR1 and IR2. This is clearly a discrepancy as IR1 construction is required in conditions more severe than those requiring IR2 construction in Table 503.1.

This proposed code change will increase the level of fire protection and provide a more logical and consistent level of performance for exterior wall assemblies against fire impingement and flame spread for IR1 where defensible space is nonconforming by:

- Requiring a minimum of 1 hr. fire resistance rating for all exterior wall assemblies to address fire impingement, and,
- Limiting the flame spread index of exterior siding materials to address flame spread to other areas of the building.

Note: IBC is the source of all suggested definitions.

Bibliography:

1. INTERTEK DIRECTORY OF BUILDING PRODUCTS, Louisiana-Pacific - LP WeatherLogic® Air & Water Barrier Fire Performance, https://bpdirectory.intertek.com/pages/DLP_SearchDetail.aspx?SpecID=67818

2. Design for code acceptance 3, American Wood Council, Fire-resistance-rated wood-frame wall and floor/ceiling assemblies. https://awc.org/wp-content/uploads/2021/12/awc-dca3_20210209_awcwebsite.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This modification to the code will raise construction costs by introducing two stipulations for exterior walls.
According to research performed by IBHS and Headwaters Economics in 2022 [3], replacing a wooden composite cladding of a 1-hr fire rated wall assembly with fiber cement lap siding would increase the construction cost $1.38 per square foot in northern California. To attain a 1-hour fire-rated wall assembly for a wall constructed with noncombustible siding, the addition of 5/8-inch type X gypsum sheathing behind the siding is necessary, incurring an additional cost of approximately $0.40 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

The existing code mandates that exterior walls should be built with either a one-hour fire-resistant rated assembly or an ignition-resistant exterior surface. In contrast, the proposed amendment will necessitate exterior walls to be constructed with both a one-hour fire-resistant rated assembly and an ignition-resistant exterior surface where provisions of Section 603 (defensible space requirement) are not met.

Bibliography

[3] Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

WUIC36-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for disapproval of the proposal were: Concerns about the new proposed definition of exterior surfaces regarding weather-exposed surfaces. Specifically, that there are degrees of weather exposure including all sorts of different types of exposure including being subject to sun, rain, and moisture. There was also expressed concern about the 40-minute test requirement. (Vote: 13-0)

WUIC36-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 202, 504.5, 504.5.1, 504.5.2, 504.5.3

Proponents: Milad Shabanian, Insurance Institute for Buisness & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Delete without substitution:

~~**EXTERIOR SURFACES.** Weather-exposed surfaces.~~

~~**EXTERIOR WALL.** A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.~~

504.5 Exterior walls. Where defensible space conforms to the provisions of Section 603, exterior walls of buildings or structures shall be constructed in accordance with Section 504.5.1 or Section 504.5.2.
Where defensible space does not conform to the provisions of Section 603, exterior walls of buildings or structures shall be constructed in accordance with Section 504.5.1 and Section 504.5.2.

Flashing shall be applied in accordance with Section 504.5.3.

Revise as follows:

504.5.1 Exterior wall assemblies. Exterior wall assemblies of buildings or structures shall have a minimum of 1-hour fire-resistance-rating, rated for exposure on the exterior side ~~in accordance with Section 501.3~~.
~~The exposed bottom edge of combustible sheathing shall be protected with noncombustible building material with a minimum assigned protection time of 40 minutes, or the sheathing shall be inset to rest directly on the foundation.~~

~~**Exception:** The bottom edge of exposed combustible sheathing is permitted to be covered with corrosion-resistant metal flashing provided there is an air gap of at least 1 inch between the metal flashing and the bottom edge of the combustible sheathing. Both legs of the flashing shall be attached a maximum of 6 inches (152.4 mm) on center.~~

504.5.2 Exterior wall covering ~~surfaces~~ . The exterior wall covering~~surfaces~~ shall be constructedwith *ignition-resistant building materials* in accordance with Section 503.2.

Exception: Exterior walls of heavy timber or log wall construction.

~~in accordance with one or more of the followings:~~

1. ~~Approved noncombustible materials complying with Section 503.2.1.~~
2. ~~Fire-retardant treated wood complying with Section 503.2.2.~~
3. ~~Ignition-resistant building materials complying with Section 503.2.4.~~

504.5.3 Flashing. A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

Reason: The primary objective of WUIC 36-24 is to address the performance of exterior walls against wildfire and direct flame exposure for buildings with and without the required defensible space. During the first committee action hearings, three key concerns were raised by the committee and opponents, which this comment aims to address.

- The first concern pertains to the definition of ‘exterior surfaces’ that was proposed to be added. Historically, the term has been used in Table 503.1 since 1997, and WUIC 36-24 sought to maintain consistency by using the same terminology. However, WUIC20-24, which was Approved as Modified during the first committee action hearings, changed to the the term to ‘exterior wall covering.’ Consequently, the proposed definition has been aligned with WUIC20-24.
- The second concern pertained requiring 40-minute protection for the exposed bottom edge of combustible sheathing on exterior walls. Although the proposed change contains language consistent with the International Building Code (IBC) and two option were provided, it was decided to remove this requirement with this comment. The plan is to collaborate with opponents and reintroduce it later.
- Lastly, an exception has been added specifically for heavy timber and log wall constructions to address concerns raised by the committee and others. This aligns the proposal with WUIC20-24, which exempts heavy timber and log wall construction from requiring noncombustible exterior wall coverings under the most severe wildfire conditions. Consequently, this comment ensures consistency in exterior wall requirements within IR1 and is consistent with WUIC20-24.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This modification to the code will raise construction costs by introducing two stipulations for exterior walls.
According to research performed by IBHS and Headwaters Economics in 2022 [1], replacing a wooden composite cladding of a 1-hr fire rated wall assembly with fiber cement lap siding would increase the construction cost $1.38 per square foot in northern California. To attain a 1-hour fire-rated wall assembly for a wall constructed with noncombustible siding, the addition of 5/8-inch type X gypsum sheathing behind the siding is necessary, incurring an additional cost of approximately $0.40 per square foot.

[1] Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

Estimated Immediate Cost Impact Justification (methodology and variables):

The existing code mandates that exterior walls should be built with either a one-hour fire-resistant rated assembly or an ignition-resistant exterior surface. In contrast, the proposed amendment will necessitate exterior walls to be constructed with both a one-hour fire-resistant rated assembly and an ignition-resistant exterior surface where provisions of Section 603 (defensible space requirement) are not met.

Comment (CAH2)# 54

WUIC37-24

IWUIC: 504.6

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5. **Exception:**

1. Where defensible space conforms to the provisions of Section 603, complete ~~Complete~~ enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed with one of the following: ~~protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant treated wood. The fire-retardant treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

   1.1 Exterior 1-hour fire-resistance-rated construction.

   1.2. Noncombustible material.

   1.3. Heavy timber or log wall construction.

   1.4. Fire-retardant treated wood labeled for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.

   1.5. Ignition-resistant building material on the exterior surface.

2. Where defensible space does not conform to the provisions of Section 603, complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction in accordance with Section 501.3 and the exterior surfaces of these assemblies are constructed with one of the following materials:

   2.1. Noncombustible material complying with Section 503.2.1

   2.2. Fire-retardant-treated wood complying with Section 503.2.2

   2.3. Ignition-resistant building materials complying with Section 503.2.4.

Reason: Table 503.1 requires the use of Ignition Resistant Construction Class 1 (IR1) in situations where defensible space is nonconforming. In such conditions, the structure may be exposed to embers, radiation heat, and direct flame contact during a wildfire. Accordingly, the underfloor area of the building needs to provide a minimum resistance against these exposures.

Currently, the exception in section 504.6 provides 3 alternatives for constructing the unenclosed underfloor areas of buildings:

1. Materials approved for not less than 1-hour fire-resistance-rated (FRR) construction on the exterior side.
2. Heavy timber construction
3. Fire-retardant treated wood.

These methods do not provide protection from flame spread during a wildfire. This proposal addresses this issue by creating two

exceptions addressing conditions with nonconforming defensible space and conditions with conforming defensible space.

For the nonconforming defensible space condition, this proposal requires the underside of exposed floors and exposed structural columns, beams and supporting walls to protected with 1-hour fire-resistant-rated construction and also protected on the exterior surfaces by ignition-resistant building materials complying with Section 503.2. This would provide protection from flame impingement and reduce rate of flame spread in areas where defensible space is nonconforming.

For the confirming defensible space condition, this proposal permits the use of the currently specified materials but expands the options to include noncombustible construction, log wall construction, and ignition resistant building materials on the exterior surface consistent with construction methods permitted by other areas in Section 504.

An additional inconsistency is that requirements for underfloor areas in the IWUIC are the same for IR1 and IR2. This is clearly a discrepancy as IR1 construction is required in conditions more severe than those requiring IR2 construction in Table 503.1. This proposed code change will increase the level of fire protection and provide a more logical and consistent level of performance for underfloor areas against fire impingement and flame spread for IR1 where defensible space is nonconforming by:

- Requiring a minimum of 1 hr. fire resistance rating to address fire impingement, and,
- Limiting the flame spread index of exterior surfaces to address flame spread to other areas of the building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This code change proposal may increase the construction cost only where the underfloor area height is enough to be usable and 1-hour rated columns or walls covered on the exterior with combustible materials having a flame spread index more than 25 when tested in accordance with ASTM E84 (Figure 1). In such a case, the siding material will need to be removed or replaced with an ignition-resistant building material (noncombustible, FRTW, IR material) having a flame spread index less than 25.

According to research performed by IBHS and Headwaters Economics in 2022 [1], replacing a wooden composite cladding with fiber cement lap siding would increase the construction cost $1.38 per square foot in northern California.

Estimated Immediate Cost Impact Justification (methodology and variables):

Bibliography

[1] Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

Figure 1. Usable unenclosed underfloor areas.

WUIC37-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was based upon the testimony of proponent that previous actions address the concerns this proposal was attempting trying to address. (Vote: 13-0)

WUIC37-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.6

Proponents: Milad Shabanian, Insurance Institute for Buisness & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5. **~~Exception~~ Exceptions:** ~~Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

1. Where defensible space conforms to the provisions of Section 603, complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected with 1-hour fire-resistance-rated construction or *ignition-resistant building materials* complying with Section 503.2 on the exterior side.
2. Where defensible space does not conform to the provisions of Section 603, complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected with 1-hour fire-resistance-rated construction and *ignition-resistant building materials* complying with Section 503.2 on the exterior side.
3. Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed with heavy timber or log wall construction.

Reason: WUIC 37-24 had three main objectives:

- Address the issue with direct flame contact in nonconforming defensible space conditions.
- Expand alternatives to include noncombustible construction, log wall construction, and ignition-resistant building materials.
- Differentiate underfloor enclosure requirements between IR1 and IR2. Although both provide similar wildfire protection, their risk profiles vary.

During CAH#1, the committee and opponents provided comments on WUIC36-24 which are also applicable to WUIC 37-24. This comment aligns WUIC37-24 with WUIC36-24-SHABANIAN-C1. During CAH#1, concerns were raised with WUIC36-24 regarding the proposed definition "exterior surfaces" and the lack of consideration for log wall construction. This comment ensures alignment between WUIC37-24 and WUIC36-24-SHABANIAN-C1. Specifically, it removes the proposed defintion of exterior surfaces and adds a new exception for heavy timber and log wall construction.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or more. This code change proposal may increase the construction cost only where the underfloor area height is enough to be usable and 1-hour rated columns or walls covered on the exterior with combustible materials having a flame spread index more than 25 when tested in accordance with ASTM E84 (Figure 1). In such a case, the siding material will need to be removed or replaced with an ignitionresistant building material (noncombustible, FRTW, IR material) having a flame spread index less than 25.

Estimated Immediate Cost Impact Justification (methodology and variables):

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Comment (CAH2)# 55

WUIC39-24

IWUIC: 504.6, 505.5.1 (New), 505.6, 506.3 (New), 506.3, 504.5.1

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

Add new text as follows:

505.5.1 Flashing. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections.

Revise as follows:

505.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

Add new text as follows:

506.3 Exterior walls. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections.

Revise as follows:

~~**506.3**~~ **506.4 Underfloor enclosure.** Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 506.3. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code. A minimum of 6 inches of noncombustible material or metal flashing extending vertically from grade is required on the exterior of columns and walls.

504.5.1 Flashing. A minimum of 6 inches (152 mm) of ~~metal flashing or~~ noncombustible material or metal flashing extending~~applied~~ vertically is required on the exterior of the wall ~~shall be installed~~ at the ground, decking and roof intersections.

Reason: In the 2024 IWUIC, a new section was added to Class 1 ignition resistant construction (IR1) that requires a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the wall at the ground, decking and roof

intersections. In a wildfire event, buildings are threatened by at least one of the three fundamental wildfire exposures: embers, radiant heat, or direct flame contact. Of these exposures, ember exposure stands out as a prevalent cause of building ignition. Embers, propelled for miles by the wind, can penetrate small openings and accumulate around buildings, particularly where combustible debris is also present (Figure1).

Figure 1. 6-in noncombustible vertical clearance worked as fuel break at the base of exterior walls in Lahaina wildfire. Photo credit: Steve Hawks, IBHS.

Therefore, this proposal will add protection against embers for all structures in wildfire-prone areas by expanding ember protection requirements in IR1 and adding ember protection for IR2 and IR3. Figure 2 shows a 6-in noncombustible vertical clearance at the base of exterior walls and underfloor columns.

a b

Figure 2. 6-in Noncombustible vertical clearance at the base of exterior walls and underfloor area columns: a. Lahaina Fire 2023 (Photo curtesy Milad Shabanion, IBHS), b. Glass Fire 2020 (Photo curtesy Steve Hawks, IBHS).

The objective of this proposal is to enhance the resilience of buildings in wildfire-prone regions against embers by requiring a 6-inch noncombustible vertical clearance on exterior walls for all ignition resistant construction classes where they intersect with horizontal surfaces such as the ground, decks, and roof assemblies.

This code change intends to improve the protection of a vertical surface where the vertical surface intersects with a horizontal surface. The intersection of a vertical and horizontal surface is a known area where debris tends to accumulate and where embers tend to accumulate during a wildfire. The combination of accumulated debris and embers can ignite the debris, enabling the fire to spread to the vertical surface. The first part of this proposal adds a minimum 6 inches of noncombustible flashing on the exterior walls of Ignition-Resistant Class 2 and 3 constructions at points where exterior walls intersect with horizontal surfaces. The remainder of this proposal extends an equivalent level of ember-resistance to exposed columns and vertical members within unenclosed underfloor areas across all three classes of ignition-resistant construction.

Section 504.5.1 is proposed to be revised to match the language proposed for Sections 504.6, 505.5.1, 505.6, 506.3 and 506.4 and to

provide some clarity. As currently written, Section 504.5.1 could be interpreted to require metal flashing or noncombustible materials on a noncombustible wall such as a concrete or masonry wall. This clearly was not the intent of the original language. The revised language is intended to clarify this.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This code change may increase the construction cost only where the exterior walls intersect with unenclosed projections such as attached decks, balconies, and roofs such as dormers.

Estimated Immediate Cost Impact Justification (methodology and variables):

The noncombustible flashing that needs to be installed instead of exterior siding material in these cases may be cheaper or more expensive than the siding material considering the range of flashing products available in the market. But in general the cost increase will not be significant. A review of common retailers websites indicates that the cost of 6 inch wide metal flashing varies according to the quantity purchased. Galvanized steel metal flashing that is 6 inches wide costs approximately $24.24 for a 50 foot length. This is approximately $0.48 per foot of material. Labor and fastener costs are estimated to be minimal.

WUIC39-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that it necessary to work out how the specified material or flashing is to be installed in the locations listed and it is a minimal cost worthwhile detailed addition. (Vote: 11-2)

WUIC39-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.5.1, 505.5.1, 506.3

Proponents: Gary J Ehrlich, NAHB, NAHB (gehrlich@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.5.1 Flashing. A minimum of 6 inches (152 mm) of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections. Flashing provided in accordance with this section shall be lapped with flashing, counterflashing, or water-resistive barriers as required by the *International Building Code* or *International Residential Code*.

505.5.1 Flashing. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections. Flashing provided in accordance with this section shall be lapped with flashing,

counterflashing, or water-resistive barriers as required by the *International Building Code* or *International Residential Code*.

506.3 Exterior walls. A minimum of 6 inches of noncombustible material or metal flashing extending vertically is required on the exterior of the wall at the ground, decking and roof intersections. Flashing provided in accordance with this section shall be lapped with flashing, counterflashing, or water-resistive barriers as required by the *International Building Code* or *International Residential Code.*

Reason: The purpose of this committee comment is to insure any flashing added against the face of an exterior wall at a deck or other projection to comply with this section is properly integrated with flashing and water-resistive barrier materials provided in accordance with the IBC and IRC for moisture protection. Taken literally, the existing language added to the 2024 IWUIC for Class 1 construction, and the proposed language for Class 2 and 3 construction, could lead a builder or contractor to simply install a section of metal flashing or other non-combustible flashing material directly against the face of an exterior wall at a deck or roof intersection and think they are done. While this will provide the desired protection against embers landing on the deck or lower roof, it creates a "reverse shingle" condition that could allow moisture (e.g., from heavy rainfall) to wick down behind the flashing, reach wood framing components, and cause decay that could compromise structural performance. This comment adds language highlighting the need to integrate flashing used for ember protection with other flashing, counterflashing, or water-resistive barriers required at deck, roof and wall intersections for moisture protection. This could be accomplished by providing counterflashing behind the siding that laps over the exterior flashing provided for ember protection or extending a portion of the water-resistive barrier material to lap over the exterior flashing. If necessary, the counterflashing or WRB material can also be ignition-resistant or non-combustible material, or the flashing required by this section can extend through the flashing and the proper lapping accomplished behind the wall cladding.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IBC and IRC already require flashing at exterior wall intersections with roofs, chimneys, porches, decks, balconies and similar projections, or other locations where moisture can enter a wall. Further, the IRC explicitly requires flashing to be installed "shingle fashion", specifies details for integration of WRB's and counterflashing with deck ledger flashing, and provides for counterflashing at roof sidewalls. Therefore, this comment simply provides clarification regarding practices already necessary for compliance with the IBC and IRC.

Comment (CAH2)# 233

WUIC42-24

IWUIC: 504.7, 505.7

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org); Jason Smart, American Wood Council (jsmart@awc.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7 Appendages and projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be ~~not less than 1-hour fire-resistance-rated construction, *heavy timber construction* or~~ constructed of one of the following:

1. 1-hour *fire-resistance-rated construction.*
2. *Heavy timber construction.*
3. ~~1.~~ *Approved noncombustible* materials.
4. ~~2.~~ Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. ~~3.~~ Ignition-resistant building materials in accordance with Section 503.2. **Exception:** Coated materials shall not be used as the walking surface of decks.
6. Any materials permitted by code where all exterior walls to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.

505.7 Appendages and projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be ~~not less than 1-hour *fire-resistance-rated construction*, *heavy timber construction* or~~ constructed of one of the following:

1. 1-hour *fire-resistance-rated construction.*
2. *Heavy timber construction.*
3. ~~1.~~ *Approved noncombustible* materials.
4. ~~2.~~ Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. ~~3.~~ Ignition-resistant building materials in accordance with Section 503.2. **Exception:** Coated materials shall not be used as the walking surface of decks.
6. Any materials permitted by code where all exterior walls to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.

Reason: The two options currently listed in the charging language of Sections 504.7 and 505.7 for appendages and projections are moved down into the existing list of other options. An additional option is added to the requirements for unenclosed accessory structures, such as decks, in Class 1 and Class 2 ignition-resistant construction. This additional option allows for unenclosed accessory structures to be constructed of any materials permitted by code where the exterior walls, to which the unenclosed accessory structures are attached, comply with enhanced fire protection requirements. These enhanced fire protection requirements for exterior walls require both a 1-hour fire-resistance rating and use of ignition-resistant materials on the exterior side. These requirements are more stringent than current exterior wall requirements in Class 1 ignition-resistant construction, which is permitted to be used where defensible space provisions of Section 603 are not met. This option for enhanced protection of the adjacent exterior walls will help prevent entry of fire into the building in the event of ignition of the unenclosed accessory structure, such as decks.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 or less. There could be a cost decrease for some buildings.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides one additional option for compliance (Item 6). This new option allows for more cost-effective deck construction in cases where exterior walls meet enhanced fire protection requirements. The other existing provisions and options currently allowed in 504.7 and 505.7 remain functionally unchanged.

WUIC42-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: It is premature to add this option if there is a standard under development. It would be good for that standard to be developed and testing to be done to see how the deck would affect the exterior wall. Also, the need to address the exterior glazing, vents, and door openings. (Vote: 12-1)

WUIC42-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.7, 505.7

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org); Jason Smart, American Wood Council (jsmart@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

504.7 Appendages and projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be constructed of one of the following:

1. 1-hour *fire-resistance-rated construction*.
2. *Heavy timber construction*.
3. *Approved noncombustible* materials.
4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant building materials in accordance with Section 503.2. **Exception:** Coated materials shall not be used as the walking surface of decks.

6. Any materials permitted by code where ~~all~~ exterior walls ~~to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.~~ within five feet (5') horizontally from the unenclosed accessory structure or projection comply with the following.

   6.1. Exterior walls are 1-hour fire-resistance rated, rated for exposure to fire from the exterior side;

   6.2. Exterior walls are constructed of ignition-resistant materials complying with Section 503.2 on the exterior side;

   6.3. Glazing in such exterior walls have a fire-protection rating of not less than 45 minutes, rated for exposure to fire from the exterior side;

   6.4. Doors in such exterior walls have a fire-protection rating of not less than 45 minutes, rated for exposure to fire from the exterior side;

   6.5. Vents in such exterior walls comply with the performance requirements of Section 504.10.1; and

   6.6. Eaves and soffits in such exterior walls comply with the requirements of Section 504.3.

505.7 Appendages and projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be constructed of one of the following:

1. 1-hour *fire-resistance-rated construction*.
2. *Heavy timber construction*.
3. *Approved noncombustible* materials.
4. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
5. Ignition-resistant building materials in accordance with Section 503.2. **Exception:** Coated materials shall not be used as the walking surface of decks.
6. Any materials permitted by code where ~~all~~ exterior walls ~~to which the *unenclosed accessory structure* is attached have a 1-hour fire-resistance rating, rated for exposure to fire from the exterior side, and have ignition-resistant materials complying with Section 503.2 on the exterior side.~~ within five feet (5') horizontally from the unenclosed accessory structure or projection comply with the following.

   6.1. Exterior walls are 1-hour fire-resistance rated, rated for exposure to fire from the exterior side;

   6.2. Exterior walls are constructed of ignition-resistant materials complying with Section 503.2 on the exterior side;

   6.3. Glazing in such exterior walls have a fire-protection rating of not less than 45 minutes, rated for exposure to fire from the exterior side;

   6.4. Doors in such exterior walls have a fire-protection rating of not less than 45 minutes, rated for exposure to fire from the exterior side;

   6.5. Vents in such exterior walls comply with the performance requirements of Section 505.10.1; and

   6.6. Eaves and soffits in such exterior walls comply with the requirements of Section 504.3.

Reason: This proposal has been updated to incorporate feedback from the committee and opposing testimonies regarding the need for additional protection of the structure. New provisions have been included to enhance fire-protection measures of windows, doors, soffits and eaves in the adjacent wall(s), as well as an extension of these fire-protection measures for a specified distance beyond the edge of the deck. Note that the fire-protection rating of the windows and doors were increased to 45 minutes of protection, instead of 20 minutes that are required in other places in the IWUIC. This corresponds with fire-protection ratings required for windows and doors in one-hour fire-resistance-rated exterior wall assemblies in accordance with IBC Section 716. Also, the other options in Section 504.8 (and 505.8) for tempered glazing, multiple layered glazing panels, and glass block are not mentioned here because they are not tied to a performance

requirement. This is the same reason why the options for noncombustible doors or solid core wood doors found in 504.9 (and 505.9) have been removed.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides one additional option for compliance with unenclosed accessory structures attached to buildings. Because this is just one option out of six, if a designer or builder chooses not to use this option, there would be no cost of construction change. However, if a designer or builder does choose to use this option, depending on the existing fire protection measures of the building, it could increase the cost of some buildings.

Comment (CAH2)# 113

WUIC44-24

IWUIC: 504.7.1, 505.7.1, 506.6 (New), 506.6.1 (New)

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.7.1 Underfloor areas. ~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5.~~
Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with exterior wall construction in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 504.7 and a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

505.7.1 Underfloor areas. ~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5.~~Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with one of the following methods:

1. Exterior wall construction in accordance with Section 505.5.

2. Noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 505.7 and a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

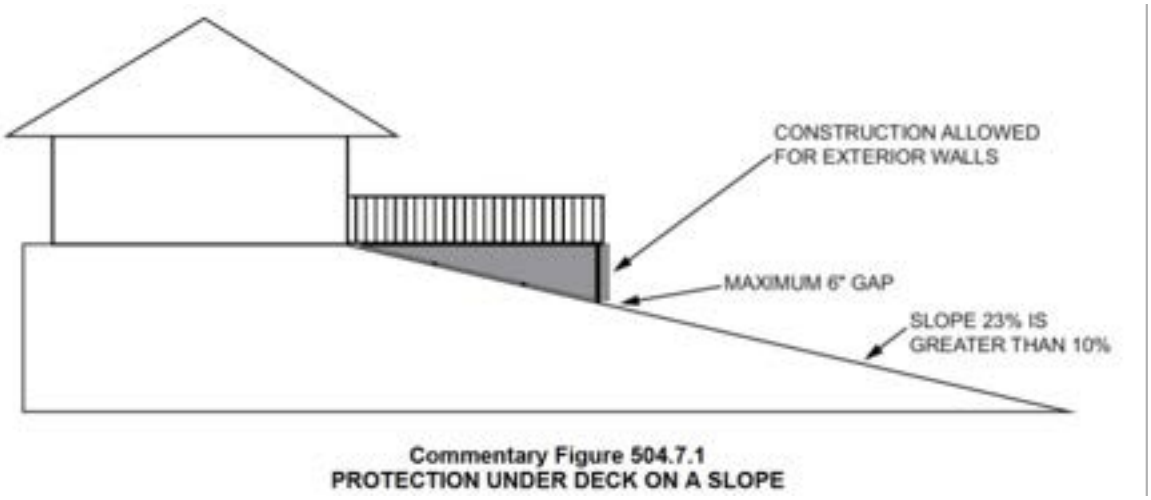
Add new text as follows:

506.6 Appendages and projections. The underfloor areas of unenclosed accessory structures and projections, such as decks, balconies, porches, and stairs attached to buildings with habitable spaces shall be constructed in accordance with Section 506.6.1

506.6.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm). **Exception:** Complete enclosure shall not be required where a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of columns and supporting walls at the ground.

Reason: Figure 1 clarifies the intention of sections 504.7.1 and 505.7.1. There are 4 concerns surrounding the current requirements of the IWUIC regarding the construction of an underfloor area of attached accessory structures.
First, there is no scientific reason to support the slope limitations provided in these sections. All structures, their attached accessory structures, detached accessory structures and their underfloor areas are exposed to at least one of the wildfire exposures. As it is well studied, wildfires can threaten buildings through three different exposures: embers, radiation heat, and direct flame contact. Excluding the underfloor area of attached accessory structures located on a surface with a slope less than 10 percent will result in excluding many balconies, decks, stairs, and other attached accessory structures constructed on flat surfaces. The code requirements should not

differentiate between underfloor areas of building and attached structures. This is also against the requirements provided in the California Building Code (Chapter 7A, Section 707.9A).



Commentary Figure 504.7.1
PROTECTION UNDER DECK ON A SLOPE

Figure 1. 6-in gap at the ground level (IWUIC Commentary).

Second, technical concerns around having a 6-in opening at the base of walls. Currently, the code requires the underfloor areas of attached accessory structures to be fully enclosed to within 6 inches (152 mm) of the ground (Figure 1). The 6-in opening seems to be required for water irrigation purposes. However, this requirement does not align well with provided construction methods for attached accessory structures.

According to sections 504.7 and 505.7, appendages and projections shall be constructed with one of the following alternatives:

1. 1-hour fire-resistant construction.
2. Heavy timber construction.
3. Approved noncombustible materials.
4. Fire-retardant-treated wood.
5. Ignition-resistant building materials in accordance with section 503.2.

In a 1-hour fire-resistant floor assembly, the fire shall not pass the floor assembly for at least 1 hour during ASTM E119 or UL 263 fire test. Consequently, water intrusion through the floor system is not possible.

In heavy timber construction, based on the definition (Figure 2) from IBC, “the exterior walls are of noncombustible materials” with some exceptions.

602.4.4 Type IV-HT. Type IV-HT (Heavy Timber) construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated heavy timber or structural composite lumber (SCL), without concealed spaces or with concealed spaces complying with Section 602.4.4.3. The minimum dimensions for permitted materials including solid timber, glued-laminated timber, SCL and cross-laminated timber (CLT) and the details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.4.1 or 602.4.4.2 shall be permitted. Interior walls and partitions not less than 1- hour fire-resistance rated or heavy timber conforming with Section 2304.11.2.2 shall be permitted.

Figure 2. IBC requirements for Heavy Timber (HT) construction.

Figure 3 provides examples of attached accessory structure constructed with noncombustible materials. It is evident that building a noncombustible attached accessory structure with maximum 6-in gap at the base is unnecessary and impractical in many cases. IWUIC provides an exception for underfloor areas of buildings and detached accessory structures while missing a similar requirement for attached accessory structures. In many instances such as examples provided in Figure 3, attached accessory structures are required to have unenclosed underfloor areas and having an exception is unavoidable.

Figure 3. Unenclosed and enclosed attached accessory structure nonconforming with current requirements.

In addition, there is a safety concern about having a 6-in gap at the base during a wildfire. Combustible debris and embers can both collect in corners and around the building where exterior walls intersect with horizontal surfaces (Figure 4). IBHS research shows that protecting these areas with noncombustible materials can protect the building from ignitions caused by embers. Leaving a gap at the base of exterior walls of attached accessory structures will increase the chance of combustible debris and ember accumulation under the deck area.

Figure 4. Ember accumulation around a building, IBHS Research Center.

Finally, the IWUIC provides identical requirements for construction of underfloor areas of attached accessory structures in IR1 and IR2. On the other hand, the IWUIC does not address this known vulnerability in IR3. All buildings located in wildfire prone areas need to be always protected against ember exposure.

This code change proposal intends to address these concerns by revising the requirements in sections 504.7.1 and 505.7.1 and adding a new section forIR3.

Section 504.7.1 revised to:

- Eliminate the slope limitation.
- Eliminate the 6-in opening at the base.

- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas.

Section 505.7.1 revised to:

- Eliminate the slope limitation.
- Eliminate the 6-in gap at the base.
- Provide additional alternative (1/8-in noncombustible mesh) for protection of underfloor areas to make it less restrictive than IR Class 1.
- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas.

New section added to IR Class 3 to:

- Add a 1/8-in noncombustible screen mesh protection for underfloor areas to make it ember-resistant with less restrictive requirements than IR Class 1 and 2.
- Add exception for unenclosed underfloor areas.
- Add a 6-in noncombustible flashing requirement to columns and walls of unenclosed underfloor areas to make unenclosed underfloor areas ember-resistant.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This code change proposal will increase the construction cost where it expands the scope of these sections through eliminating the limitation of the ground slope. However, the code change will reduce construction costs by proposing exceptions for unenclosed underfloor areas. It will also increase the construction cost in IR Class 3 construction where the code change will mandate additional requirements for protecting underfloor areas with 1/8-in noncombustible mesh screen or 6-in metal flashing.

According to research performed by IBHS and Headwaters Economics in 2022 [1], constructing an unenclosed underfloor area with a wall constructed with noncombustible cement board siding instead of a wall with wooden composite siding will increase the construction cost $1.38 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

Bibliography

[1] Headwaters Economics and Insurance Institute for Business & Home Safety, 2022, Construction costs for a wildfire-resistant home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

WUIC44-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for the approval of the proposals were: It is expanding options versus being more restrictive and because of that, it provides more options for the design. Additionally, it was noted that it is supported with the data provided. (Vote: 8-4)

WUIC44-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.7.1, 505.7.1, 506.6.1

Proponents: Gary J Ehrlich, NAHB, NAHB (gehrlich@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.7.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with materials permitted for exterior wall construction in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 504.7 and a minimum of 6 inches of ~~metal flashing or~~ noncombustible material or metal flashing extending ~~applied~~ vertically from grade is provided on the exterior of ~~the vertically aligned structural elements such as~~ supporting columns and ~~supporting~~ walls ~~at the ground~~.

505.7.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with one of the following methods:

1. Materials permitted for exterior ~~Exterior~~ wall construction in accordance with Section 505.5.

2. Noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 505.7 and a minimum of 6 inches of ~~metal flashing or~~ noncombustible material or metal flashing extending ~~applied~~ vertically from grade is provided on the exterior of ~~the vertically aligned structural elements such as~~ supporting columns and ~~supporting~~ walls ~~at the ground~~.

506.6.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where a minimum of 6 inches of ~~metal flashing or~~ noncombustible material or metal flashing extending ~~applied~~ vertically from grade is provided on the exterior of supporting columns and ~~supporting~~ walls ~~at the ground~~.

Reason: The existing language of Sections 504.7.1 and 505.7.1, and the revised language in Section 504.7.1 and Item #1 under 505.7.1, require the underfloor space to be enclosed with exterior wall construction complying with 504.5 or 505.5, as applicable. The use of the term “exterior wall” can be taken literally to mean the underfloor space shall be enclosed with exterior wall assemblies that not only comply with the IWUIC’s requirements for using materials or methods of construction that provide ignition and fire resistance, but also need to meet structural requirements for out-of-plane wind loads and lateral wind and seismic resistance through shear walls or wall bracing, weather protection requirements (i.e., water-resistive barriers and flashing), and energy code requirements for insulation and air barriers. The cost and design implications of providing a complete enclosure for these underfloor areas that essentially makes them occupiable or habitable spaces is considerable.Note also if the underfloor areas affected by this proposal are completely enclosed and of a size and height that could be converted to habitable space, some jurisdictions may count the area as part of the total square footage for property tax assessment purposes, thus increasing the homeowner’s tax burden (and monthly cost to a tenant if the property is rented) even more than would occur simply due to the higher cost of construction to comply with IWUIC requirements.This comment follows the lead of the current IWUIC commentary for the existing requirements, which refer to enclosing the underfloor area with “materials allowed for exterior wall construction.” This is very different than calling the resulting enclosure an “exterior wall” and would not necessarily lead a designer, builder, or code official to apply all of the requirements consistent with an exterior wall.This comment also revises the requirements for 6” of noncombustible material or metal flashing to align with the language used for similar requirements in WUIC39-24. The key difference is removing the language specifying the material be “applied vertically on the exterior”, which could be interpreted to require 6” of metal flashing or other noncombustible material be applied over a column or wall that is already constructed of noncombustible material.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This comment will decrease the cost of construction relative to the original proposal

Estimated Immediate Cost Impact Justification (methodology and variables):

This comment will decrease the cost of construction relative to the original proposal as it will provide for enclosing spaces below decks, stairs, porches and other accessory structures or projecting elements in a manner that will protect against ember intrusion and radiant heat but not create an enclosure that building officials may also require incorporate lateral structural resistance, protection against moisture intrusion and vapor drive, and even insulation and air barriers.

Comment (CAH2)# 301

Comment 2:

IWUIC: 504.7.1, 505.7.1, 506.6.1

Proponents: Gary J Ehrlich, NAHB, NAHB (gehrlich@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.7.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with exterior wall construction in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 504.7 and vertically aligned structural elements at grade such as columns and supporting walls are protected with a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior at grade ~~of the vertically aligned structural elements such as columns and supporting walls at the ground~~.

505.7.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with one of the following methods:

1. Exterior wall construction in accordance with Section 505.5.

2. Noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are constructed in accordance with Section 505.7 and vertically aligned structural elements at grade such as columns and supporting walls are protected with a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior at grade. ~~of the vertically aligned structural elements such as columns and supporting walls at the ground.~~

506.6.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where vertically aligned exposed structural elements such as columns and supporting walls are protected with a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior at grade. ~~of columns and supporting walls at the ground.~~

Reason: The purpose of this committee comment is to address an issue with the construction of balconies created by WUIC43 including

them in the list of elements considered to be accessory structures or projections with underfloor areas that need to be regulated by 504.7, 505.6 and 506.6 and also by this proposal. The exception as currently written can be interpreted to apply only if an accessory structure or projection is supported on exposed columns or walls. Otherwise, enclosure to grade is required.

However, balconies are cantilevered from the structure of the building they are associated with and do not have exposed supporting columns or walls outside the exterior walls of the building. Thus, one could interpret a balcony two or more stories above grade would have to be enclosed all the way down to grade. Besides the significant cost implications of doing so, this doesn't make sense even from a wildfire mitigation perspective. Being a structurally cantilevered element, the extent that a balcony can project from the face of a building is self-limiting, thus the ability of heat or embers to be trapped below a balcony is limited.

This comment revises the language addressing the need for exposed supporting columns and walls at grade to consist of noncombustible materials for the first 6 inches above grade or be protected with noncombustible flashing for the first six inches to clarify that part of the exception only applies if such elements exist. Otherwise, a balcony would still need to be constructed of fire-rated construction, heavy timber, noncombustible materials, fire-retardant-treated wood or other ignition-resistant materials.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The original proposal as modified by this committee comment will increase the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal as modified by this committee comment will still increase the cost of construction for unenclosed accessory structures connected to buildings with habitable space and projections that are supported by exposed columns or walls at grade and would either need to be enclosed by exterior walls complying with IWUIC requirements or have the bottom 6" of exposed columns and walls be noncombustible material or protected with 6 inches of noncombustible flashing. But with the comment, balconies on a multifamily building (or other building) would not need to be enclosed all the way down to grade, which could be many floors worth of enclosure.

Comment (CAH2)# 554

Comment 3:

IWUIC: 504.7.1, 504.7.1.1 (New), 504.7.1.2 (New), 505.7.1, 506.6, 506.6.1

Proponents: Jonathan Humble, Jonathan Humble, FAIA, LLC, National Multi-Family Housing Council (festeel@att.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

504.7.1 Underfloor areas. *Unenclosed accessory structures* and projections attached to buildings with habitable spaces shall ~~have underfloor areas enclosed to the ground with exterior wall construction in accordance with Section 504.5.~~ be constructed in accordance with 504.7.1.1 or 504.7.1.2.

Exception: ~~Complete enclosure shall not be required where the underside of exposed floors and~~ Walls shall not be required for *accessory structures* and projections whose exposed structural columns, beams and supporting walls are constructed of fire-retardant-treated wood or ignition resistant building materials ~~in accordance with Section 504.7 and~~ that include a minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

Add new text as follows:

504.7.1.1 Accessory structures and projections near grade . *Unenclosed accessory structures* and projections attached to buildings

with habitable spaces, that are less than 80 inches (2,032 mm) measured from the deck, floor, or landing framing underside to any point to the grade below, including accessory stairs or ramps and intermediate landings, shall be constructed in accordance with one or more of the following:

1. *Accessory structures* or projections constructed of approved *noncombustible* building materials in accordance with Section 503.2.1, with noncombustible ground cover installed at grade below the *accessory structure* or projection.
2. From the deck, floor or landing the accessory structure or projection shall be enclosed with walls constructed in accordance with Section 504.5 down to grade.

504.7.1.2 Accessory structures and projections above other accessory structures and projections. *Unenclosed* a*ccessory structures* and projections attached to buildings with habitable spaces, that are 80 inches (2,032 mm) or greater measured from the deck, floor, or landing underside framing to another deck, floor, or landing surface below or to the grade below, shall be constructed in accordance with one or more of the following:

1. Constructed of *noncombustible* building materials in accordance with Section 503.2.1,
2. Constructed of *ignition-resistant building material*s in accordance with Section 503.2.4.

505.7.1 Underfloor areas. *Unenclosed accessory structures* and projections attached to buildings with habitable spaces shall ~~have underfloor areas enclosed to the ground with one of the following methods:~~ be constructed in accordance with Section 504.7.1.

~~1. Exterior wall constructed in accordance with Section 505.5.~~
~~2. Constructed of ignition-resistant building material in accordance with 503.2.4.~~

Exception: ~~Complete enclosure shall not be required where the underside of exposed floors and~~ Walls shall not be required for accessory structures or projections whose exposed structural columns, beams and supporting walls are constructed of fire-retardant-treated wood or ignition resistant building materials ~~in accordance with Section 505.7 and~~ that include a minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the vertically aligned structural elements such as columns and supporting walls at the ground.

506.6 Appendages and projections. The underfloor areas of *unenclosed accessory structures* and projections, such as decks, balconies, porches, and stairs attached to buildings with habitable spaces shall be constructed in accordance with Section 506.6.1 or 504.7.1.

506.6.1 Underfloor areas. Unenclosed accessory structures and projections attached to buildings with habitable spaces shall have underfloor areas enclosed to the ground with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm).

Exception: Complete enclosure shall not be required where a minimum of 6 inches of metal flashing or noncombustible material applied vertically on the exterior of columns and supporting walls at the ground.

Reason: The original proposal WUI44-24 changed the requirements from a fire mitigation protection requirement (Radiant heat and fire) to a requirement designed to mitigate the impact of burning embers to unenclosed accessory structures and projections by establishing requirements for either noncombustible construction or the creation defensible spaces.

Unfortunately, the proposal also created unintended consequences. The original proposal requires that all balconies or decks above other balconies or decks be enclosed. Example, a balcony or deck on the second or higher story would be required to have its underside enclosed down to the deck or balcony below because the proposal does not provide guidance as to how to address this scenario. Another Example, a balcony or deck on a second story with no balcony or deck below would be required to enclose the underside down two-stories to grade because of a lack of direction in the proposal. The National Multi-Family Housing Council does not believe this to be the intent by the proponent nor the bibliographical material provided by the proponent.

Further, the requirement for enclosure of the underfloor area of a accessory structure or projection is based on the proponents reason statement which

discusses debris accumulation as the culprit. However, the example photographs in Figure 3 of the proponents reason statement, and the bibliographical materials, both illustrate clean underfloor areas with outdoor furniture. This raises the question if the issue is debris or deck furniture?

Finally, the exceptions in 504.7.1 and 505.7.1 appear to be redundant to their charging paragraph. Both Sections 504.5 and 505.5 that are referenced contain a list of acceptable building materials, however it is not clear why the application of metal flashing at the base of columns of noncombustible or even ignition resistant building material will provide any better fire resistance or improve the amount of time for embers to impact those building materials.

The modifications shown in this proposal attempt to compromise with the proponents intended scope, as follows:

1. The modifications are designed to handle two scenarios each; the first where a balcony or deck is near grade, and the second where a balcony or deck is above another deck or another story, or, above grade by more than 80 inches,
2. addressing decks and balconies above the first-floor level to have differing requirements to mitigate burning embers from initiating a fire to the habitable portion of the building.
3. Differentiating requirements for noncombustible construction versus other constructions requirements for wall enclosures,
4. Inclusion of a minimum headroom requirement of 80 inches (Value taken from the International Building Code Chapter 11) for any point under the unenclosed accessory structure or projection to further demarcate the change from a structure or projection near grade versus one at a greater height or over another structure or projection,
5. The exceptions in 504.7.1 and 505.7.1 were revised to apply to only those materials that could combust and not noncombustible building materials, and
6. Revising Section 506.6 by adding the optional use of Section 504.7.1,

These changes will allow the ember protection requirements to be maintained and at the same time allow building owners to design buildings with balconies or decks on all stories.

Bibliography: No bibliographical items.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The modification proposed will increase the cost impact the same as the original proposal WUIC44-24. The additional measures needed to provide a defendable space under decks, balconies, landings that the like will require additional materials and labor to provide same.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposed modification will increase the construction cost as the requirements for requiring ember mitigation require building materials that are noncombustible or ignition-resistant which are of greater cost that the materials currently allowed in the 2024 IWUIC. Cost will vary on which measure is designed into the building.

Comment (CAH2)# 496

WUIC45-24

IWUIC: 504.9, 504.9.1 (New), 505.9, 505.9.1 (New), 506.9 (New), 506.9.1 (New)

Proposed Change as Submitted

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net)

2024 International Wildland Urban Interface Code

Revise as follows:

504.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid-core wood not less than $1\frac{3}{4}$ inches thick (44 mm) and protected with a minimum 6-inch noncombustible material, such as a kick plate, applied at the base on the exterior of the door, or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 504.8. **~~Exception~~ Exceptions:** ~~Vehicle access doors.~~

1. Vehicle access doors.
2. The 6 inches of noncombustible material at the base is not required for solid-core wood doors not less than $1\frac{3}{4}$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.

Add new text as follows:

504.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum of 6-in noncombustible material that extends vertically from the base.

Revise as follows:

505.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid core wood not less than $1\frac{3}{4}$ inches thick (45 mm) and protected with a minimum 6-inch noncombustible material such as a kick plate at the base on the exterior of door , or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8. **~~Exception~~ Exceptions:** ~~Vehicle access doors.~~

1. Vehicle access doors.
2. The 6 inches of noncombustible material at the base is not required for solid-core wood door not less than $1\frac{3}{4}$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.

Add new text as follows:

505.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum 6-in noncombustible material that extends vertically at the base.

506.9 Exterior doors. Exterior doors shall be protected with a minimum 6-inch noncombustible material at the base on the exterior of the door. **Exceptions:**

1. Vehicle access doors.
2. Exterior doors protected by an approved noncombustible door such as a storm door.

506.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum 6-in noncombustible material that extends vertically at the base.

Reason: Like other parts of the building envelope, exterior doors can be exposed to flames, radiant heat, and embers. NIST's Waldo Canyon Fire (2012) post-investigation in El Paso County, Colorado, reports doors as a frequent damaged component of the building [1]. Maintaining a proper defensible space around the building reduces the potential thermal insults from flames. However, embers can still accumulate at the base of a door and potentially penetrate through the door jamb. IBHS's post-Marshall Fire (2021) investigation in Boulder County, Colorado, showed damage to exterior doors due to ember accumulation at the base, as can be seen in Figure 1a. Figure 1b demonstrates ignition of the door jamb due to ember penetration during the Victorian Bushfire (2009) in Australia [2].

(a) (b)

Figure 1. ignition from accumulation of embers and debris at the base of the door.

This code change proposal intends to address this vulnerability by providing requirements for all buildings located in wildfire prone areas (IR1,2 and 3) to protect the exterior doors against embers.

Requiring a 6-in noncombustible vertical protection by a kickplate at the base of exterior doors or a storm door will reduce this vulnerability (Figure 2).

(a) (b)

Figure 2. Protection for exterior doors (a) storm door, (b) kickplate.

The 6-in noncombustible vertical clearance at the base of the door can protect the exterior door assembly against embers. As a part of this effort, a new section was added to the IR1, 2, and 3 exterior doors to protect exterior underfloor access doors (Figure 3) against embers.

(a) (b)

Figure 3. Exterior underfloor access doors (a) unprotected vs. (b) protected against embers.

Bibliography: [1] Maranghides, A., McNamara, D., Vihnanek, R., Restaino, J., & Leland, C. (2015). A Case Study of a Community Affected by the Waldo Fire Event Timeline and Defensive Actions (NIST Technical Note 1910). National Institute of Standards and Technology. https://doi.org/10.6028/NIST.TN.1910
[2] Leonard, J. (2009). Report to the 2009 Victorian bushfires Royal Commission. Building performance in bushfires (CSIRO Sustainable Ecosystems, Issue. CSIRO Sustainable Ecosystems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This code change will slightly increase the construction cost by requiring a 6-in noncombustible protection at the base for exterior doors and exterior underfloor access doors.

Estimated Immediate Cost Impact Justification (methodology and variables):

A web search of several retailers carrying kickplate, storm doors and a metal underfloor access door revealed that a kickplate costs approximately $33, a storm door costs approximately $400 and 12-in by 12-in metal underfloor access door costs around $40. Additional labor costs are estimated to be negligible.

WUIC45-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The desire to have the revisions in two separate proposals. The underfloor space and noncombustible door there add value to the requirements. Concern about putting something in the code that in real life scenarios may not do anything. It includes all types of doors including glass doors which is not appropriate. The committee would like to see some more evidence of the doors and the fire consuming the structure. (Vote: 12-1)

WUIC45-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.9, 504.9.1, 505.9, 505.9.1, 506.9, 506.9.1

Proponents: Milad Shabanian, Insurance Institute for Business & Home Safety, Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid-core wood not less than $1\frac{3}{4}$ inches thick (44 mm) ~~and protected with a minimum 6-inch noncombustible material, such as a kick plate, applied at the base on the exterior of the door~~ or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 504.8. **Exception ~~Exceptions~~:**

1. ~~1.~~ Vehicle access doors.
2. ~~2. The 6 inches of noncombustible material at the base is not required for solid-core wood doors not less than $1\frac{3}{4}$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.~~

504.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum of 6-in noncombustible material that extends vertically from the ~~base~~ ground.

Revise as follows:

505.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid core wood not less than $1\frac{3}{4}$ inches thick (45 mm) ~~and protected with a minimum 6-inch noncombustible material such as a kick plate at the base on the exterior of door~~ or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8. **Exception ~~Exceptions~~:**

1. ~~1.~~ Vehicle access doors.
2. ~~2. The 6 inches of noncombustible material at the base is not required for solid-core wood door not less than $1\frac{3}{4}$ inches thick (44 mm) protected by an approved noncombustible door such as a storm door.~~

505.9.1 Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a minimum 6-in noncombustible material that extends vertically at the base.

Delete without substitution:

~~**506.9 Exterior doors.** Exterior doors shall be protected with a minimum 6-inch noncombustible material at the base on the exterior of the door. **Exceptions:**~~

1. ~~Vehicle access doors.~~
2. ~~Exterior doors protected by an approved noncombustible door such as a storm door.~~

Revise as follows:

506.9.~~1~~ Exterior underfloor access doors. Exterior underfloor access doors shall be constructed with noncombustible material or a

minimum 6-in noncombustible material that extends vertically at the base.

Reason: This comment addresses feedback provided by the committee. The committee found merit in the proposed changes related to exterior underfloor access doors. However, they weren't convinced that the new requirements proposed for exterior doors were needed and requested more evidence indicating a problem. The committee recommended that the issues raised in this proposal should be submitted in two separate proposals. Based on the committee's reason and recommendations to the proponents, this comment simply removes the requirements proposed for exterior doors and maintains the parts related to underfloor access doors.

Cost Impact: Increase

Estimated Immediate Cost Impact:

A web search of several retailers carrying metal underfloor access door revealed that a 12-in by 12-in metal underfloor access door costs around $40. Additional labor costs are estimated to be negligible.

Estimated Immediate Cost Impact Justification (methodology and variables):

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Comment (CAH2)# 56

WUIC46-24

IWUIC: 504.9.1 (New), ASTM Chapter 07, UL Chapter 07

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Add new text as follows:

504.9.1 Garage door perimeter gap. Exterior garage doors for vehicles shall resist the intrusion of embers by protecting the gaps between each door and the opening at the bottom, sides and top by all of the following:

1. Bottom opening shall provide a maximum gap of 1/8 inch (3.2 mm) between the surface and the door opening seal.
2. Sides and top by one or more of he following:

   2.1 Provide a maximum gap of 1/8 inch (3.2 mm) between the door and the door opening.

   2.2 Cover or block the gap with weather-stripping products constructed of materials which comply with both of the following:

      2.2.1 The tensile strength of he material shall be tested in accordance with ASTM D638 before and after light exposure in accordance with ASTM G155 for a period of 2000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.

      2.2.2 The material shall be tested in accordance with UL 94 and have a flammability rating of V-2 or better.

   2.3 Cover or block the gap with metal flashing.

Revise as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

D638-22	Standard Test Method for Tensile Properties of Plastics.
G155—21	Practice for Operating Xenon Arc Light Apparatus For Exposure of Nonmetallic Materials

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

94-2023	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, 7th edition

Reason: One of the issues with wildland fires is the spread of flaming or hot embers into structures. This proposal is intended to address protection of vehicle door of a garage to reduce this exposure and eliminate a route of ember entry by addressing the gap created between the garage door and the garage door opening.

Section 504.9.1 requires a battery backup for motorized garage door openers. Often in a wildland fire, utility power is shut down, or damaged, to an area or region. When the utility power is no longer available, and the residents need to evacuate, the garage door can still be opened to allow vehicles to exit and then closed to protect the opening into the garage.

Section 504.9.2 addresses the gap, or clearance, provided around the garage door allowing for door movement and operation. This gap needs to be evaluated to inhibit the passage of flaming embers. There are four methods of protection offered in this section: 1) design the door so there is a maximum ⅛" gap on all four sides of the door; 2) provide weatherstripping to cover or fill the gap—weatherstripping must be designed to stay in place during the impact of the fire so criteria is provided (Items 2.1 and 2.2) to address the strength and

flammability of the material; and 3) install metal flashing to cover the gap. Any one of the methods can be utilized, or a combination of these methods will suffice. For example, the door may have less than a 1/8" gap along the header (Item 3) and be provided with weatherstripping on the bottom and sides (Item 2).

As part of the requirements for protecting the gap, new test standards are included to ensure that where weather-stripping is chosen as the solution, the weather-stripping material is reliable and dependable for the purpose.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The approximate cost of compliance to add an approved protection material around the edges of a vehicle garage door is $50. As this is only one of the compliance options, the added cost will be applicable in an estimated 1/3 to 1/2 of the cases.

Estimated Immediate Cost Impact Justification (methodology and variables):

The materials needed for compliance with this proposal are readily available in the retail and wholesale building supply chain. Installation labor is minimal or can be DIY.

WUIC46-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that the testimony all supported the fact that gaps in garage door openings is a problem that needs fixing, and the nationally recognized standards can be used in the new requirements to protect these gaps. (Vote: 12-1)

WUIC46-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.9.1, UL Chapter 07

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.9.1 Garage door perimeter gap. Exterior garage doors for vehicles shall resist the intrusion of embers by protecting the gaps between each door and the opening at the bottom, sides and top by all of the following:

1. Bottom opening shall provide a maximum gap of 1/8 inch (3.2 mm) between the surface and the door opening seal.
2. Sides and top by one or more of he following:

   2.1 Provide a maximum gap of 1/8 inch (3.2 mm) between the door and the door opening.

   2.2 Cover or block the gap with weather-stripping products constructed of materials which comply with ~~both of~~ the following:

      2.2.1 The tensile strength of he material shall be tested in accordance with ASTM D638 before and after light exposure in accordance with ASTM G155 for a period of 2000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.

      ~~2.2.2 The material shall be tested in accordance with UL 94 and have a flammability rating of V-2 or better.~~

   2.3 Cover or block the gap with metal flashing.

Delete without substitution:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

~~94-2023~~ ~~Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, 7th edition~~

Reason: UL 94 (Tests for Flammability of Plastic Materials for Parts in Devices and Appliances) is a small scale test intended to be used solely to measure and describe the flammability properties of materials, used in devices and appliances, in response to a small open flame or radiant heat source under controlled laboratory conditions. The scope specifically states the test requirements do not cover polymeric materials when used for building construction.

This test standard is not the correct test for evaluating garage-door edge-gap materials used to protect against intrusion of embers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed language does not add cost, one could even argue that it removes a test and therefore it reduces the cost of construction.

Comment (CAH2)# 238

WUIC48-24

IWUIC: 504.10, 505.10

Proposed Change as Submitted

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents. Where provided, ~~ventilation~~ openings ~~for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening~~ intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10 Vents. Where provided, ~~ventilation~~ openings ~~for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening~~ intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Reason: The existing charging language of sections 504.10 and 505.10 contains a lengthy and potentially incomplete list which includes a mixture of constructions (e.g., enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces) and ventilation opening locations (e.g., gable ends, ridge ends, under eaves and cornices, foundations). However, a careful review of the current language reveals the intent is for the provisions to apply to any "opening intended to permit ventilation." This proposal simplifies the charging language by removing the list and relying on the heart of the provision, i.e., all ventilation openings are to be protected.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal makes no technical change to existing provisions. Therefore, there should be no impact on construction cost. See also the proponent's reason statement.

WUIC48-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The approval of the proposal was based on the proponent's reason statement. (Vote: 11-2)

WUIC48-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.10, 505.10, 506.5

Proponents: Gary J Ehrlich, NAHB, NAHB (gehrlich@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Ventilation Openings~~Vents~~. Where provided, openings intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings. **Exceptions:**

1. Clothes dryer and kitchen exhaust openings shall comply with the duct termination requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.
2. Duct and air transfer openings in exterior walls provided for fully-ducted HVAC systems shall comply with the opening protection requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.

505.10 Ventilation Openings~~Vents~~. Where provided, openings intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings. **Exceptions:**

1. Clothes dryer and kitchen exhaust openings shall comply with the duct termination requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.
2. Duct and air transfer openings in exterior walls provided for fully-ducted HVAC systems shall comply with the opening protection requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.

506.5 Ventilation openings~~Vents~~. Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure. **Exceptions:**

1. Clothes dryer and kitchen exhaust openings shall comply with the duct termination requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.
2. Duct and air transfer openings in exterior walls provided for fully ducted HVAC systems shall comply with the opening protection requirements of the *International Mechanical Code* or *International Residential Code*, as applicable.

Reason: The purpose of this committee comment is to resolve a conflict that proposal WUIC15-21 created last cycle and WUIC48-24 drew more attention to.

From the 2006 through the 2018 edition of the IWUIC, Sections 504.10 and 505.10 allowed ventilation openings to be “designed and approved to prevent flame or ember penetration into the structure” as an alternative to the noncombustible corrosion-resistant mesh. This provided a compliance path for exhaust and intake vents not specific to ventilated attic and rafter assemblies or crawlspace foundations. While the concept of protecting all openings in a wildfire-prone area makes sense, the removal of the performance language in deference to either providing noncombustible corrosion-resistant mesh with openings not exceeding 1/8” or listed vent products tested to ASTM E2886 creates conflicts with openings for dryer and kitchen exhaust vents as well as openings for intake and exhaust vents serving HVAC equipment. Despite the fact the IWUIC commentary on these sections focuses on attic and crawlspace vents. these other

types of openings can easily be interpreted as being “intended to permit ventilation” and requiring them to be protected only with 1/8” mesh or listed vent products creates conflicts with existing provisions in the IBC, IRC, and IMC addressing such openings. This comment proposes two exceptions to resolve the conflict.

Exception #1 points to the provisions of the IMC and IRC for clothes dryer and kitchen exhaust openings. IMC Section 505.4 and IRC Section M1502.3 for dryer exhaust duct terminations, and IMC Section 505.3 and IRC Section M1503.3 for kitchen exhaust discharge, require a backdraft damper at the exhaust duct termination or exhaust discharge. Further, the IMC and IRC specifically prohibit the installation of screens at dryer exhaust duct terminations. To prevent an internal conflict between the I-Codes, an exception to address these openings is required. Note these dampers are typically aluminum or steel blades or frames, are designed to close to prevent inward (reverse) airflow and can be gravity operated (where air pressure or wind velocity could close the damper) or motorized. It is clear these dampers will by default protect against ember intrusion.

Exception #2 points to the applicable provisions for protection of other duct and air transfer openings in the IBC and IRC. IBC Section 717 provides requirements for ducts and air transfer openings required to be protected (e.g., when such openings are in fire-rated exterior walls). Further, IRC Section R303.6, IMC Section 401.5 and IMC Section 501.3.2 require air exhaust and intake openings be protected with corrosion-resistant screens, louvers or grills with ¼” min and ½” max opening size, and otherwise comply with exterior wall opening protection requirements in the IBC. These openings will generally lead to metallic ducts that would not present an ignition risk should embers penetrate the screens, louvers or grills.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The exceptions proposed in the committee comment point to existing code provisions that address clothes dryer and kitchen exhaust vents and HVAC intake and exhaust vents. At the very least these pointers simply clarify what is already required for these sorts of ventilation openings, thus there is no cost impact. The pointers could reduce cost relative to the original proposal by eliminating potential conflicts or heading off someone requiring a listed, fire-tested vent where it is not necessary or where such a product may not even exist.

Comment (CAH2)# 304

Comment 2:

IWUIC: 504.10, 505.10

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Ventilation openings~~Vents~~. Where provided, openings intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10 Ventilation openings~~Vents~~. Where provided, openings intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Reason: WUIC48-24 was supported as submitted during CAH #1. However, the Committee suggested that a change in section titles

would improve the proposal. This comment is in direct response to that suggestion. Specifically, it recommends changing the titles of Sections 504.10 and 505.10 from "Vents" to "Ventilation openings," which aligns the section titles with the contents of the sections.

A separate comment to WUIC51-24 offers the same change for Section 506.5 to address the titles of all three of the relevant sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The comment alters section titles only, which will have no effect on cost of construction.

Comment (CAH2)# 154

Comment 3:

IWUIC: 504.10, 505.10

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents. Where provided, openings intended to permit ventilation of enclosed attics or enclosed rafter spaces in accordance with *International Building Code* Section 1202.2 or of under-floor areas in accordance with *International Building Code* Section 1202.4, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10 Vents. Where provided, openings intended to permit ventilation of enclosed attics or enclosed rafter spaces in accordance with *International Building Code* Section 1202.2 or of under-floor areas in accordance with *International Building Code* Section 1202.4, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

Reason: Existing language of 504.10 and 505.10 indicate that all "openings ... intended to permit ventilation" are to be protected. WUIC48-24 removes an unnecessary and potentially incomplete list of opening types and locations and retains this core requirement. Opposition testimony when WUIC48-24 was heard during the first Committee Action Hearing raised concerns that the proposed changes would cause an interpretation not previously exercised that penetrations through the building envelope which do not terminate within an enclosed attic, enclosed rafter space, or under-floor area, such as HVAC intake and exhaust openings or clothes dryer exhausts, would require protection.

The proponent is unaware of any instances in which building envelope penetrations which do not provide access to an enclosed attic, enclosed rafter space, or under-floor area have led to issues in wildfires. Therefore, this comment proposes to restrict the ventilation opening provisions to enclosed attic, enclosed rafter space, and under-floor area openings, since these are the openings of concern that evidence indicates can be problematic during a wildfire.

A companion comment to WUIC51-24 is being offered to address this issue in Section 506.5 to provide coordination across all three ignition resistant construction classes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Although the existing code language requires protection of all "openings ... intended to permit ventilation," the understood practice is not to protect openings such as clothes dryer exhausts and HVAC intakes and exhausts in accordance with these sections. Based on that understanding, this comment represents a clarification to align code language with current practice, and as such, should cause no change in cost of construction.

Comment (CAH2)# 160

WUIC51-24

IWUIC: 504.10, 504.10.2, 505.10, 505.10.2, 506.5

Proposed Change as Submitted

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Wildland Urban Interface Code

Revise as follows:

504.10 Vents. Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical surface~~ , shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.2 Prescriptive requirements. ~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed $^1/_8$ inch (3.2 mm) or with vents ~~shall be~~ designed and *approved* ~~approved~~ to prevent flame or ember penetration into the structure.

505.10 Vents. Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, ~~either in a horizontal or vertical surface,~~ shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10.2 Prescriptive requirements. ~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents ~~shall be~~ designed and *approved* ~~approved~~ to prevent flame or ember penetration into the structure.

506.5 Vents. ~~Where provided, attic ventilation~~ Ventilation openings~~, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents~~ shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents~~shall be~~ designed and *approved*~~approved~~ to prevent flame or ember penetration into the structure.

Reason: This proposal makes changes to the IWUIC vent provisions (1) to clarify that ventilation openings are permitted on sloped surfaces, (2) to remove the ventilation opening size limitation from the prescriptive compliance option, and (3) to require full coverage of ventilation openings regardless of the compliance path. Also, the proposal cleans up the prescriptive options (sections 504.10.2 and 505.10.2) and section 506.5 by removing the unnecessary and potentially confusing list of ventilation opening locations.

Ventilation Openings on Sloped Surfaces. The ventilation sections in the 2024 IWUIC restrict ventilation openings to horizontal or vertical surfaces. This could imply that ventilation openings on sloped surfaces (e.g., rooftops) are not subject to these requirements, which is not understood to be the intention or a desirable interpretation. Ventilation openings on all surfaces of the building should provide protection, and removal of the restriction to horizontal and vertical surfaces from sections 504.10 and 505.10 clarifies that all ventilation openings must be addressed.

Prescriptive Option Size Limitation. The size of ventilation openings is limited to 144 square inches when complying via the prescriptive option. This restriction has been in the IWUIC since the first edition, but no technical justification was discovered during an examination of the available code development records or through discussions with several parties involved in creation of the original IWUIC and

California Building Code Chapter 7A provisions. It is worth noting that California provisions have not included such a size limitation.

Full Coverage of Ventilation Openings. The performance compliance option in sections 504.10.1 and 505.10.1 includes the important provision that ventilation openings be fully covered. This proposal adds this practical requirement to the prescriptive path and to section 506.5.

Cleanup. Sections 504.10.2, 505.10.2 and 506.5 include an unnecessary list of ventilation opening locations. In their simplest form, these sections state, "Where provided, ventilation openings ... in vertical or horizontal surfaces and vents through roofs ...." The intention is clearly to require these provisions to apply to any ventilation opening. The cleanup simplifies the language and eliminates potential misinterpretation of the requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes offered in this proposal primarily improve clarity of existing provisions. Removal of the ventilation opening size restriction which is present in the prescriptive requirements should not affect construction cost because the existing performance path already provides a means to demonstrate compliance for vents installed over ventilation openings which are larger than 144 square inches.

WUIC51-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that it is an editorial change to bring into compliance what is already acceptable practice. (Vote: 13-0)

WUIC51-24

Individual Consideration Agenda

Comment 1:

IWUIC: 506.5

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

506.5 Ventilation openings~~Vents~~. Ventilation openings shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents designed and *approved* to prevent flame or ember penetration into the structure.

Reason: Both WUIC51-24 and WUIC48-24 were supported as submitted during CAH #1. While considering WUIC48-24, the Committee suggested that a change in section titles would improve the proposal. This comment is in direct response to that suggestion. Specifically, it recommends changing the title of Section 506.5 from "Vents" to "Ventilation openings," which aligns the section title with the content of

the section.

This is offered as a comment to WUIC51-24 because section 506.5 was not included in WUIC48-24. A separate comment to WUIC48-24 offers the same change for Sections 504.10 and 505.10.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The comment alters section titles only, which will have no effect on cost of construction.

Comment (CAH2)# 153

Comment 2:

IWUIC: 506.5

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

506.5 Vents. Where provided, ~~V~~ventilation openings of enclosed attics or enclosed rafter spaces in accordance with *International Building Code* Section 1202.2 or of under-floor areas in accordance with *International Building Code* Section 1202.4 shall be fully covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or with vents designed and *approved* to prevent flame or ember penetration into the structure.

Reason: Although the existing language of Section 506.5 in the 2024 IWUIC requires protection of all openings through the building envelope (i.e., by stating the requirements apply to "other ventilation openings in vertical exterior walls and vents through roofs"), the simplification of the vents section charging language in all three ignition resistant classes proposed via WUIC48-24 and WUIC51-24 raised concerns that the new language would cause an interpretation not previously exercised that penetrations through the building envelope which do not terminate within an enclosed attic, enclosed rafter space, or under-floor area, such as HVAC intake and exhaust openings or clothes dryer exhausts, would require protection.

The proponent is unaware of any instances in which building envelope penetrations which do not provide access to an enclosed attic, enclosed rafter space, or under-floor area have led to issues in wildfires. Therefore, this comment proposes to restrict the ventilation opening provisions to enclosed attic, enclosed rafter space, and under-floor area openings, since these are the openings of concern that evidence indicates can be problematic during a wildfire.

The same change is offered in a comment to WUIC48-24 for Sections 504.10 and 505.10 to align the provisions across all three ignition resistant construction classes.

The comment also brings back the opening phrase, "Where provided," so that Section 506.5 is consistent with 504.10 and 505.10.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Although the existing code language requires protection of all openings, the understood practice is not to protect openings such as clothes dryer exhausts and HVAC intakes and exhausts in accordance with this section. Based on that understanding, this comment represents a clarification to align code language with current practice, and as such, should cause no change in cost of construction.

Comment 3:

IWUIC: 504.10.2, 505.10.2, 506.5

Proponents: Brent Pickett, Western Fire Center, Inc., O'Hagin (brent@westernfire.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.10.2 Prescriptive requirements. Attic vents must be noncombustible and corrosion-resistant. Additionally, all v~~V~~entilation openings shall be fully covered with noncombustible corrosion-resistant material(s) including mesh with openings not to exceed $^{1}/_{8}$ inch (3.2 mm) or with vents designed and *approved* to prevent flame and ~~or~~ ember penetration into the structure.

505.10.2 Prescriptive requirements. Attic vents must be noncombustible and corrosion-resistant. Additionally, all v~~V~~entilation openings shall be fully covered with noncombustible corrosion-resistant material(s) including mesh with openings not to exceed $^{1}/_{8}$ inch (3.2 mm) or with vents designed and *approved* to prevent flame and ~~or~~ ember penetration into the structure.

506.5 Vents. Attic vents must be noncombustible and corrosion-resistant. Additionally, all v~~V~~entilation openings shall be fully covered with noncombustible corrosion-resistant material(s) including mesh with openings not to exceed $^{1}/_{8}$ inch (3.2 mm) or with vents designed and *approved* to prevent flame and ~~or~~ ember penetration into the structure.

Reason: By removing the phrase “either in horizontal or vertical surface” would then allow essentially all vent types to be used, including sloped roof vents as indicated in the proposed rationale.

The existing 504.10.1 section gives performance requirements for vents tested to ASTM E2886, which are not applicable for “roof ridge and off-ridge (field) vents” (see section 1.1 in E2886). This is because many of the existing roof vents are typically too large for the E2886 test apparatus. The proposed change to 504.10.2 gives prescriptive requirements limiting the vent opening and requires that all vent types have #1) “a noncombustible and corrosion-resistant mesh not to exceed ⅛ inch” or be #2) “designed and approved to prevent flame or ember penetration into the structure.”

Since there is not currently a performance standard to resist flame and embers for roof vents, the only method for approval would be the prescriptive approach by requiring ⅛” noncombustible mesh. However, as currently drafted, this approach only attempts to mitigate the ember issue, but it completely neglects the flame concern. Both aspects of fire protection need to be addressed.

Research regarding vents has been performed at our independent third-party fire testing laboratory on multiple on-the-market roof vents using a modified E108 test (fire test for roof coverings) that exposes individual roof vent samples to the flame defined in the E108 with a combustible cotton target in the attic space below the vent opening (sheathing). We found that with some plastic/combustible roof vents (including field, intake, and ridge vents), the dripping and burning plastic dripped down through the vent opening and ignited the cotton target (see images below of some instances).

Based on these findings, it is proposed instead of requiring only the mesh to be noncombustible, that the vent material itself also be noncombustible, which would eliminate the potential for combustible flames from the vent itself to enter the attic space. Ultimately, it will make the structure much less susceptible to exterior WUI fire. Furthermore, the melting of the attic vents creates an inherent safety issue for first responders (see image below).

Bibliography: ASTM E108

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

None. Noncombustible, corrosion-resistant vents are already sold in high volumes across the US.

Comment (CAH2)# 703

WUIC53-24

IWUIC: SECTION 503, 503.1, TABLE 503.1, 503.2, 503.2.1, 503.2.2, 503.2.3, 503.2.4, 503.2.4.1, 503.2.4.2, 503.2.4.3, 503.2.4.3.1, 503.2.4.3.2, 503.2.4.3.3

Proposed Change as Submitted

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 503
~~IGNITION-RESISTANT~~ WILDLAND CONSTRUCTION AND MATERIAL

503.1 General. Buildings and structures hereafter constructed, modified or relocated into or within *wildland-urban interface areas* shall ~~meet~~comply with the construction requirements in ~~accordance with Table 503.1. Class 1, Class 2 or Class 3, ignition-resistant construction shall be in accordance with Sections 504, 505 and 506, respectively~~ Section 504. Materials required to be ignition-resistant materials shall comply with the requirements of Section 503.2.

Delete without substitution:

~~**TABLE 503.1 IGNITION-RESISTANT CONSTRUCTION[a]**~~

	~~FIRE HAZARD SEVERITY~~					
	~~Moderate Hazard~~		~~High Hazard~~		~~Extreme Hazard~~	
	~~Water Supply[b]~~		~~Water Supply[b]~~		~~Water Supply[b]~~	
~~DEFENSIBLE SPACE[c]~~	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~	~~Conforming[d]~~	~~Nonconforming[e]~~
~~Nonconforming~~	~~IR 2~~	~~IR 1~~	~~IR 1~~	~~IR 1 N.C.~~	~~IR 1 N.C.~~	~~Not Permitted~~
~~Conforming~~	~~IR 3~~	~~IR 2~~	~~IR 2~~	~~IR 1~~	~~IR 1~~	~~IR 1 N.C.~~
~~1.5 × Conforming~~	~~Not Required~~	~~IR 3~~	~~IR 3~~	~~IR 2~~	~~IR 2~~	~~IR 1~~

~~a. Access shall be in accordance with Section 403.~~

~~b. Subdivisions shall have a conforming water supply in accordance with Section 402.1.~~

~~IR 1 = Ignition-resistant construction in accordance with Section 504.~~

~~IR 2 = Ignition-resistant construction in accordance with Section 505.~~

~~IR 3 = Ignition-resistant construction in accordance with Section 506.~~

~~N.C. = Exterior walls shall have a fire-resistance rating of not less than 1 hour and the exterior surfaces of such walls shall be noncombustible. Usage of log wall construction is allowed.~~

~~c. Conformance based on Section 603.~~

~~d. Conformance based on Section 404.~~

~~e. A nonconforming water supply is any water system or source that does not comply with Section 404, including situations where there is no water supply for structure protection or fire suppression.~~

Revise as follows:

503.2 Ignition-resistant building material. Ignition-resistant building materials shall <u>be designed for exterior use and</u> comply with any one of the requirements in Section 503.2.1 through ~~503.2.4~~ <u>503.2.4.3.3</u>.

503.2.1 Noncombustible material. Material shall comply with the definition of *noncombustible* materials in Section 202.

503.2.2 Fire-retardant-treated wood. Fire-retardant-treated wood shall be identified for exterior use and shall meet the requirements of Section 2303.2 of the *International Building Code*.

503.2.3 Fire-retardant-treated wood roof coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes shall comply with the requirements of Section 1505.6 of the *International Building Code* and shall be classified as Class A roof assemblies as required in Section 1505.2 of the *International Building Code*.

503.2.4 Ignition-resistant building material. Material shall be tested on the front and back faces in accordance with the extended ASTM E84 or UL 723 test, for a total test period of 30 minutes, or with the ASTM E2768 test. The materials shall bear identification showing the fire test results. Panel products shall be tested with a ripped or cut longitudinal gap of $^{1}/_{8}$ inch (3.2 mm). The materials, when tested in accordance with the test procedures set forth in ASTM E84 or UL 723 for a test period of 30 minutes, or with ASTM E2768, shall comply with Sections 503.2.4.1 through 503.2.4.3. **Exception:** Materials composed of a combustible core and a noncombustible exterior covering made from either aluminum at a minimum 0.019 inch (0.48 mm) thickness or corrosion-resistant steel at a minimum 0.0149 inch (0.38 mm) thickness shall not be required to be tested with a ripped or cut longitudinal gap.

503.2.4.1 Flame spread. The material shall exhibit a flame spread index not exceeding 25.

503.2.4.2 Flame front. The material shall exhibit a flame front that does not progress more than 10 feet 6 inches (3200 mm) beyond the centerline of the burner at any time during the test.

503.2.4.3 Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this section under conditions of use. The materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in Sections 503.2.4.3.1 through 503.2.4.3.3, as applicable to the materials and conditions of use.

503.2.4.3.1 Evaluation requirements for weathering. Fire-retardant-treated wood, wood-plastic composite materials and plastic lumber materials shall be evaluated after weathering in accordance with Method A "Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D2898.

503.2.4.3.2 Wood-plastic composite materials. Wood-plastic composite materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D7032 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

503.2.4.3.3 Plastic lumber materials. Plastic lumber materials shall also demonstrate acceptable fire performance after weathering by the following procedure: first testing in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation, then weathering in accordance with ASTM D6662 and then retesting in accordance with ASTM E1354 and exhibiting an increase of no more than 10 percent in peak rate of heat release when compared to the peak heat release rate of the nonweathered material.

Reason: This code change proposes one construction method for buildings and structures in the wildland-urban interface area. This is a companion proposal to another proposal which deletes Sections 505 and 506. In other words, the other proposal removes Ignition Resistant Construction Classes 2 and 3. Replacing these multiple classifications with a single defined Ignition Resistant Construction as provided by Section 504 of this code. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas
2. Provide clear and consistent standards, simplifying the construction process
3. Providing a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Defensible space is a component of home hardening and the benefits go hand in hand with the construction materials. Embers will find the path of least resistance.

Defensible space is the buffer between your structure and the surrounding area.

Adequate defensible space acts as a barrier to slow or halt the progress of fire that would otherwise engulf your property. It also helps ensure the safety of firefighters defending your home. Defensible space is the first line of defense for your home against wildfire.

The intensity of wildfire fuel management varies within the 100-foot perimeter of the home, with more intense fuels' reduction occurring closer to your home. Start at the home and work your way out to 100 feet or to your property line, whichever is closer. Learn more about the Defensible Space Zones below.

It takes the combination of both Defensible Space and Home Hardening to give your home and property the best chance of surviving a wildfire.

Bibliography: Construction costs for a wildfire-resistant home: California edition - Headwaters Economics

Fire Research Division | NIST

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and

evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

WUIC53-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Based on the action and comments on WUIC54. The committee noted that they had a desire to see all these related proposals correlated into one package that could come back in the next cycle. (Vote: 11-2)

WUIC53-24

Individual Consideration Agenda

Comment 1:

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov) requests As Submitted

Reason: The proposal intends to delete Table 503.1 Ignition Resistant Material, which allows for alternative means of reducing building construction materials when defensible space and water supply are considered.

Defensible space and water supply are not constant at any given time. However, a structure's construction is constant, and when a minimum standard is applied, it can greatly assist the building's survivability.

Table 503.1 is flawed in that fire hazard severity areas evaluate the "hazard," not the risk of a structure's ignition potential. "Hazard" is based on the physical conditions that create a likelihood and expected fire behavior over a period without considering mitigation measures such as home hardening, recent wildfire, or fuel reduction efforts. "Risk" is the potential damage a fire can achieve in the area under existing conditions, accounting for any modifications such as fuel reduction projects, defensible space, and ignition-resistant building construction.

Table 502.1 Fire Hazard Severity is outdated and only evaluates critical fire weather frequency, fuel model, and slope. The factors that should be considered in determining fire hazards within wildland areas are fire history, flame length, terrain, local weather, and potential fuel over a 50-year period. Outside of wildlands, a model should consider factors that might threaten buildings, including terrain, weather, urban vegetation cover, blowing embers, proximity to wildlands, fire history, and fire hazards in nearby wildlands. One of the most important factors not considered in Table 502.1 is the areas where winds have been identified as a major cause of wildfire spread;

Another consideration is the increased risk for utility-associated wildfires.

The International Wildland-Urban Interface Code has the opportunity to be the minimum standard for the nation.This table is not a structure loss model regarding the potential ignition of building materials. The IWUIC regulations reduce the risk of embers fanned by wind-blown wildfires from igniting buildings. The roofing, siding, decking, windows, and vents codes shall apply throughout all areas of fire hazard severity.

Wildfire is not just an issue for California!

The Chimney Tops Two fire began November 23, 2016, as a human-caused wildfire in Great Smoky Mountains National Park. On November 28, driven by strong winds, it combined with ignitions from downed powerlines into a swarming conflagration that burned across 11,410 acres into Gatlinburg, Tennessee, and nearby communities. Some 2,400 structures were destroyed or damaged, and 14 people were unnecessarily killed. In a second instance, the Tubbs fire kindled from downed powerlines on the evening of October 8, 2017, became another roaring conflagration. The landscape was parched by prolonged drought, and when the ignition met with powerful east winds, the fire burned 37,000 acres of Sonoma County and into Santa Rosa, California. Some 5,600 structures were destroyed, and 22 people died. In the third instance, the Marshall Fire, beginning December 30, 2021 (Figure 1), was carried by strong winds through dry grass and across 6,000 acres in Boulder County, Colorado, initiating fires in the towns of Superior and Louisville that destroyed 1,056 structures.

Bibliography: Same as original proposal

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 787

WUIC54-24

IWUIC: SECTION 504, 504.1, 504.2, 504.2.1 (New), 504.2.1, 504.2.3 (New), 504.3, 504.3.1 (New), 504.4, 504.5, 504.5.1 (New), 504.5.1, 504.6, 504.7, 504.7.1, 504.7.2 (New), 504.7.3 (New), 504.7.3.1 (New), 504.7.3.2 (New), 504.7.3.3 (New), 504.7.3.3.1 (New), 504.7.3.3.2 (New), 504.7.3.4 (New), 504.8, 504.8.1 (New), 504.8.2 (New), 504.9, 504.9.1 (New), 504.9.2 (New), 504.9.3 (New), 504.10, 504.10.1, 504.10.2, 504.10.3, 504.11, 504.11.1, 504.11.2 (New), 504.11.3 (New), 504.11.4 (New), 504.11.5 (New), 504.11.6 (New)

Proposed Change as Submitted

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com); Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 504
~~CLASS 1 IGNITION-RESISTANT CONSTRUCTION~~ CONSTRUCTION METHODS FOR EXTERIOR WILDFIRE EXPOSURE

504.1 General. ~~Class 1 ignition~~ Ignition-resistant construction shall be in accordance with Sections 504.2 through ~~504.11~~ 504.11.6.

504.2 Roof assembly. Roofs shall have a *roof assembly* that complies with a Class A ~~rating~~ fire classification when tested in accordance with ASTM E108 or UL 790. ~~For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~ **Exceptions:**

1. Class A *roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.

Add new text as follows:

504.2.1 Roof covering gaps. Roof covering gaps and voids shall be protected as follows:

1. Where the roofing covering profile has an airspace under the roof covering and is installed over a combustible deck, the combustible deck shall be protected by any of the following:
   1.1 Install a 72-pound (32.7 kg) cap sheet, complying with ASTM D3909, over the roof deck.
   1.2 Install mineral wool board or other noncombustible material with a minimum thickness of 1 inch (25.4 mm) between the roofing material and the wood framing or deck.
   1.3 Install a Class A fire classification roof underlayment, tested in accordance with ASTM E108 or UL 790. If the sheathing consists of exterior fire-retardant treated wood, the underlayment shall not be required to comply with a Class A classification.
2. Bird stops shall be used at the eaves, when the profile fits, to prevent debris from entering at the eave. Hip and ridge caps shall be mudded to prevent intrusion of fire or embers.

Revise as follows:

~~**504.2.1**~~ **504.2.2 Roof valleys.** Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.~~4~~ 7 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.

Add new text as follows:

504.2.3 Skylights. Skylights, including tubular daylighting devices and sloped glazing shall comply with section 504.8

Revise as follows:

504.3 Protection of enclosed eaves. The exposed underside of enclosed roof ~~Eaves~~eaves and soffits shall be protected on the exposed underside by any of the following:

1. Noncombusible materials.
2. ~~ignition-resistant~~ Ignition-resistant materials . ~~or by~~
3. Fire-retardant-treated wood labeled for exterior use.
4. ~~materials~~ Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.,
5. 2-inch (51 mm) nominal dimension lumber., or
6. 1-inch (25 mm) nominal fire-retardant-treated lumber or $^{3}/_{4}$-inch (19.1 mm) nominal fire-retardant-treated plywood~~,~~ identified for exterior use ~~and meeting the requirements of Section 2303.2 of the International Building Code~~.
7. Boxed-in roof eave soffit assemblies with an underside that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

Fascias are required and shall be ~~protected on the backside by~~ ignition-resistant materials, fire retardant-treated wood labeled for exterior use ~~or by~~ materials *approved* for not less than 1-hour *fire-resistance-rated construction* or 2-inch (51 mm) nominal dimension lumber.

Add new text as follows:

504.3.1 Protection of open eaves. The exposed roof deck on the underside of unenclosed roof eaves shall consist of one or more of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. Fire-retardant-treated wood labeled for exterior use.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side.
5. 2-inch (51 mm) nominal dimension lumber.
6. One layer of 5/8-inch (16 mm) Type X gypsum sheathing applied behind an exterior covering on the underside of the roof deck.
7. The exterior portion of a 1-hour fire-resistance-rated exterior assembly applied to the underside of the roof deck designed for exterior fire exposure, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

Fascias, if provided, shall be of fire-retardant-treated wood, ignition-resistant materials, materials approved for not less than 1-hour fire-resistance -rated construction or 2-inch (51 mm) nominal dimension lumber.

504.4 Gutters and downspouts. Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.

Revise as follows:

504.5 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. ~~Materials *approved* for not less than~~ 1-hour *fire-resistance-rated construction* ~~on the exterior side~~.
2. *Approved noncombustible* materials.
3. Heavy timber. ~~or *log wall construction*~~ Assembly of sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks splined, tongue-and-grove or set close together and well spiked.
4. Log wall construction. Assembly that has been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.
5. Wall assemblies suitable for exterior fire exposure containing one layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior wall covering or cladding on the exterior side of the framing.

~~4.~~ 6 . Fire-retardant-treated wood ~~on the exterior side. The fire-retardant-treated wood~~ shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

~~5~~ 7. Ignition-resistant materials complying with Section 503.2 ~~on the exterior side~~.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

Add new text as follows:

504.5.1 Exterior wall coverings. The exterior wall covering shall comply with one or more of the following requirements, except as permitted for exterior walls complying with Section 504.5:

1. Noncombustible material.
2. Ignition-resistant material labeled for exterior use.
3. Fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code.

Revise as follows:

504.5.~~1~~ 2 Flashing. A minimum of 6 inches (152 mm) of metal flashing or noncombustible material applied vertically on the exterior of the wall shall be installed at the ground, decking and roof intersections.

504.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

Revise as follows:

504.7 ~~Appendages and projections~~ Projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, ~~such as~~other than decks, shall be ~~not less than 1-hour fire-resistance-rated construction,~~ *heavy timber construction* or constructed of one of the following:

1. ~~*Approved noncombustible*~~ Noncombustible materials.

2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
3. Ignition-resistant building materials in accordance with Section 503.2. ~~**Exception:** Coated materials shall not be used as the walking surface of decks.~~
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119, applied to the underside of the ceiling assembly, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor projection assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

504.7.1 ~~Underfloor areas~~ Underside of projections. ~~Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5.~~
The underside of projections shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall be protected by one or more of the following:

Exception: Structural columns and beams are not required to be protected in accordance with Section 504.7.1 when constructed with sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks shall be splined, tongue-and-groove, or set close together and well spiked.

1. Noncombustible material.
2. The ignition-resistant material shall be labeled for exterior use and shall meet the requirements of Section 503.2.
3. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119 or UL 263, applied to the underside of the floor, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

Add new text as follows:

504.7.2 Conditions of acceptance for ASTM E2957. The ASTM E2957 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 through 3 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of flame penetration of the eaves or horizontal projection assembly at any time.
2. Absence of structural failure of the eaves or horizontal projection subassembly at any time.
3. Absence of sustained combustion of any kind at the conclusion of the 40-minute test.

504.7.3 Decks. The walking surface material of decks, porches, balconies and stairs shall comply with the requirements of Sections 504.7.3.1 through 504.7.3.4.

504.7.3.1 Flashing. A minimum of a 6-inch (150 mm) metal flashing, applied vertically on the exterior of the wall, shall be installed at all deck-to-wall intersections.

504.7.3.2 Decking surfaces. The walking surface material of decks, porches, balconies and stairs shall be constructed with any of the following materials:

1. Material that complies with the performance requirements of Section 504.7.3.3.
2. Ignition-resistant material that complies with the performance requirements of Section 504.7.2.
3. Fire-retardant-treated wood labeled for exterior use and shall meet the requirements of section 2302 of the International Building Code.
4. Noncombustible material.
5. Any material that complies with the performance requirements of Section 504.7.3.4 when tested in accordance with ASTM E2632 provided that any attached exterior wall covering is noncombustible or ignition-resistant materials. **Exception:** Wall material shall be permitted to be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread index.

504.7.3.3 Performance requirements for Section 504.7.3.2, Item 1. Materials shall be tested in accordance with both ASTM E2632 and ASTM E2726 and comply with the conditions of acceptance in Sections 504.7.3.3.1 and 504.7.3.3.2. The material shall also be tested in accordance with ASTM E84 or UL 723 and comply with the performance requirements of Section 503.2.4.

504.7.3.3.1 Conditions of acceptance for ASTM E2632. . The ASTM E2632 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 through 3 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Peak heat release rate of less than or equal to 25 kW/ft² (269 kW/m²).
2. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-min observation period.
3. Absence of falling particles that are still burning when reaching the burner or floor.

504.7.3.3.2 Conditions of acceptance for ASTM E2726. The ASTM E2726 test shall be conducted, using a “Class A” size roof test brand, on a minimum of three test specimens and meet the conditions of acceptance in Items 1 and 2 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
2. Absence of falling particles that are still burning when reaching the burner or floor.

504.7.3.4 Performance requirements for Section 504.7.3.2, Item 5. The ASTM E2632 test shall be conducted on a minimum of three test specimens and meet the condition of acceptance in Item 1 below. If any one of the three tests does not meet the condition of acceptance, three additional tests shall be performed. All three additional tests must show a peak heat release rate shall be 25 kW/ft² (269 kW/ m²) or less.

Revise as follows:

504.8 Exterior glazing. Exterior windows, window walls and exterior glazed doors having a glazed area of 25 percent or more of the door area, windows within exterior doors, and skylights shall be constructed of any of the following:

1. ~~tempered glass, multilayered glazed panels,~~ Multilayered glazed panels with at least one tempered panel or dome complying with Section 2406 of the International Building Code. ~~,~~
2. ~~glass~~ Glass block units. ~~, or have a~~
3. A minimum fire-protection rating of ~~not less than~~ 20 minutes when tested in accordance with NFPA 257 or UL 9, and shall be exempt from the hose stream test.

Add new text as follows:

504.8.1 Structural glass veneer. The wall assembly behind structural glass veneer shall comply with Section 504.5.

504.8.2 Operable skylights. Operable skylights shall be protected by a non-combustible mesh screen and the dimensions of the openings in the screen shall not exceed ⅛ inch (3.2 mm).

Revise as follows:

504.9 Exterior doors. Exterior doors shall be constructed in accordance with any of the following:

1. ~~*approved noncombustible*~~ Noncombustible construction. ~~,~~
2. ~~solid core~~ Solid-core wood not less than $1\frac{3}{4}$ inches thick (44 mm). ~~, or~~
3. ~~have~~ Have a fire protection rating of not less than 20 minutes when tested according to NFPA 252.
4. The exterior door shall be constructed of solid core wood that complies with the following requirements:
   4.1. Stiles and rails shall not be less than 1 3/8 inches (35 mm) thick.
   4.2. Panels shall not be less than 1¼ inches thick, except for the exterior perimeter of the panel that shall be permitted to taper to a tongue not less than 3/8 inch (35 mm) thick.
5. The exterior surface or cladding shall be tested to meet the performance requirements of Section 504.9.3 when tested in accordance with ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.

Windows within doors and exterior glazed doors shall be in accordance with Section 504.8.

~~**Exception:** Vehicle access doors.~~

Add new text as follows:

504.9.1 Garage doors. Automatic garage door openers for vehicle doors serving a residential building shall be equipped with a battery backup function.

504.9.2 Garage door perimeter gap. Exterior garage doors shall resist the intrusion of embers from entering by preventing gaps between doors and door openings, at the bottom, sides and tops of doors, from exceeding ⅛ inch (3.2 mm). Gaps between doors and door openings shall be controlled by one of the following methods:

1. Weather-stripping products shall be constructed of materials which comply with both of the following:
   1.1. The tensile strength of the material shall be tested in accordance with ASTM D638 before and after exposure to ASTM G155 for a period of 2,000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.
   1.2. When tested to UL 94, the materials shall have a flammability rating of V-2 or better.
2. Door overlaps onto jambs and headers.

3. Garage door jambs and headers covered.

504.9.3 Conditions of acceptance for ASTM E2707. The ASTM E2707 test shall be conducted on a minimum of three test specimens and meet the conditions of acceptance in Items 1 and 2 below. If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be performed. All three additional tests must meet the conditions of acceptance.

1. Absence of flame penetration through the wall assembly at any time.
2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-minute test.

504.10 Vents. Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.1 Performance requirements. Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

Delete and substitute as follows:

~~**504.10.2 Prescriptive requirements.** Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.~~

504.10.2 Off ridge and ridge vents. Vents that are installed on a sloped roof, such as dormer vents, shall comply with all of the following:

1. Vents shall be covered with a mesh where the dimensions of the mesh therein shall be a minimum of 1/16 inch (1.6 mm) and shall not exceed ⅛ inch (3.2 mm) in diameter.
2. The mesh material shall be noncombustible.
3. The mesh material shall be corrosion resistant.

504.10.3 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

Delete and substitute as follows:

~~**504.11 Detached accessory structures.** Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for not less than 1-hour *fire-resistance-rated construction* , heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the~~

~~International Building Code.~~

504.11 Accessory buildings and miscellaneous structures. Accessory buildings and miscellaneous structures shall be constructed to conform to the ignition-resistance requirements of Sections 504.11.1 through 504.11.6.

~~**504.11.1 Underfloor areas.** Where the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6. **Exception:** The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

504.11.1 Applicability. Sections 504.11.2 through 504.11.6 apply to accessory buildings, and attached or detached miscellaneous structures, on the same lot as an applicable building, including but not limited to trellises, arbors, patio covers, gazebos and similar structures. **Exceptions:**

1. Decks shall comply with the requirements of Section 504.7.3.
2. Awnings and canopies shall comply with the requirements of Section 3105 of the International Building Code.

Add new text as follows:

504.11.2 Miscellaneous structures and accessory buildings within 3 feet.. Miscellaneous structures and accessory buildings of any size, when separated from an applicable building on the same lot by a distance of less than 3 feet (914 mm), shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.3 Accessory buildings greater than 120 square feet, located 3 feet or more but less than 50 feet. Accessory buildings that are greater than 120 square feet (11.15 m^2) in size and separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4., located 3 feet or more but less than 50 feet.

504.11.4 Accessory buildings 120 square feet or less, located 3 feet or more but less than 50 feet. When required by the enforcing agency, accessory buildings 120 square feet (11.15 m^2) or less and separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.5 Miscellaneous structures located 3 feet or more but less than 50 feet. When required by the enforcing agency, miscellaneous structures that require a permit and are separated from an applicable building on the same lot by a distance of 3 feet (914 mm) or more but less than 50 feet (15 240 mm) shall be constructed of noncombustible materials or of ignition-resistant materials as described in Section 503.2.4.

504.11.6 Roof construction. Roof assemblies and roof coverings of accessory buildings required to be constructed entirely of noncombustible materials or of ignition-resistant materials shall comply with Sections 504.2 and 504.2.1.

Reason: This code change is to propose one construction method for building and structures in the wildland area. This is the companion to another proposal to delete sections 505 and 506 with the intent to remove Ignition Resistant Construction Classes 2 and 3. Replacing these multiple classifications will be a single defined Ignition Resistant Construction as provided by Section 504. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas

2. Provide clear and consistent standards, simplifying the construction process
3. Provide a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Findings during a NIST case study of the 2018 Camp Fire (https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf) found that a primary factor in fire spread was significant ember exposure. As stated in the case study "In agreement with the other NIST case studies of WUI fires, the Camp Fire has demonstrated that embers can have significant impact on WUI communities. Laboratory and field work by NIST [57] has demonstrated that embers with enough energy to cause ignitions are readily generated from parcel-level combustibles such as landscaping mulch, fences, and firewood piles. These parcel-level fuels can cause ignitions over 40 m (130 ft) downwind. Ember ignitions downwind from parcel-level combustibles enable fire to readily spread from parcel to parcel. In high hazard areas, WUI structures therefore need to be able to withstand the exposures generated from both wildland and parcel-level combustibles." (A Case Study of the Camp Fire, pg.141)

Given the distances that embers can travel, this minimum standard of protection should be across all Wildland-Urban Interface areas; regardless of whether they have been designated as Moderate, High or Extreme hazards. An analysis of California structures damaged by wildfire in 2017 found that more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed; 92% of damaged structures being destroyed in moderate fire hazard severity zones, and 86% of damaged structures being destroyed in very high fire hazard severity zones. This data indicates that the requirements proposed in 504 which mirror the California Building Code Chapter 7A requirements are working.

Construction Costs for a Wildfire Resistant Home, California Edition (headwaterseconomics.org)

The Headwaters Economics study by the Insurance Institute for Business & Home Safety outlines that California's Chapter 7A requirements should be the bare minimum. If there is a proposal for three construction versions, using the proposed code provisions as the minimum with an enhanced version and an optimum version for best performance standards. "In preliminary research conducted by Baylis and Boomhower (2021), the authors examined home survivability factors for nearly 50,000 homes exposed to wildfires between 2007 and 2020 across California. The authors reported that a home built in 2010 or later was nearly 40% less likely to be destroyed by a wildfire compared to a home built in 1985 or before. Home survivability was closely correlated to modern building codes requiring homeowner mitigation measures. Additionally, a home was more likely to survive if its nearest neighbor also complied with recent mitigation regulations resulting in a positive net spillover effect for the larger neighborhood.

Roof - Section 504.2

Roofs are highly vulnerable to ignition due to their relatively large horizontal surface area. The exposure of roof coverings to a range of climatic conditions, including wind, rain, and sun, means the roof covering will require maintenance and eventual replacement. Many Class A fire-rated roof covering options are available (e.g., asphalt fiberglass composition shingles). A main reason the roof is vulnerable is because the roof edge—including gutters and roof-to-wall intersections where roof covering meets other materials (e.g., siding used in dormers and split-level homes)—is exposed to ember ignitions. These areas must be properly protected by adding additional flashing at roof-to-wall locations.

Under-Eave Area - Sections 504.3 and 504.3.1

Research suggests eaves are extremely important in structure survivability. Eaves play an important role for building design but they also create vulnerabilities and pathways for the building to ignite. Embers can travel through vents in the eave into the attic and accumulate in gaps between blocking and rafters in open-eave construction. Should flames reach the under-eave area, open eaves can also trap heat. Once there is an ignition in the under-eave area, fire will spread laterally more quickly.

Vents in the under-eave area are inlet openings and therefore allow air to enter the attic space. During a wildfire, vent openings can allow the entry of wind-blown embers into the interior attic space. If combustible materials in the attic ignite, the house can burn from the inside out. The importance of ember and flame entry through vents during a wildfire, and as per requirements in Chapter 7A, have resulted in the development of vents designed to resist the intrusion of flames and embers.

Exterior Wall and Wall Covering - Sections 504.5 and 504.5.1

Exterior walls and components in the wall assembly can be vulnerable if exposed to embers, flames, or prolonged exposure to radiant heat from burning items located close to the home. These exposures can ignite combustible siding and the resulting flames can spread vertically and laterally to other wall components such as windows and the under-eave area. Siding extending close to the ground can be vulnerable to ignition by embers accumulating at the base of the wall that ignite it or components in the wall assembly (e.g., wood sheathing). Requirements are included to address the wall assembly itself, along with the exterior wall covering. The wall could be fire resistant, but a combustible exterior wall covering could carry fire up the wall to the eaves and attic.

Attached Deck - Sections 504.7.3 through 504.7.3.4

Similar to a roof, a deck can cover a large horizontal surface area and can be vulnerable to embers and under-deck flame impingement exposures. A burning deck can expose the side of the house to extended radiant heat and/or direct flame contact. The deck walking surface and structural support members, as well as what is stored on or below the deck are therefore important considerations.

Most commonly used deck board products (including wood and plastic composite boards) are combustible. Decks with noncombustible walking surfaces include lightweight concrete or a flagstone product. Regardless of the walking surface, decks are typically supported by solid wood joists, beams, and columns that will be vulnerable to ignition if nearby combustible materials ignite.

Enclosing the under-deck area vertically around the perimeter can minimize the accumulation of vegetative debris, vegetation, and other combustible materials. For enclosed decks, installing vents to ensure that excessive moisture does not accumulate in the under-deck area is critical to avoid moisture-related degradation.

Glazing - Sections 504.8 through 804.8.2

Window manufacturers and suppliers indicated that where dual-pane windows are required to be tempered, most window manufacturers only supply windows with both panes tempered. Other manufacturers will supply what the customer requests, and will only provide one-pane tempered. Since all comparative versions of the wildfire-resistant home are compliant, the price of windows would not result in a significant cost difference.

Doors - Section 504.9

Doors and door frames can fail for the same reasons as windows. Embers can accumulate in the small gaps between the door and frame, resulting in ignition of the door-framing and weather-sealing material.

Vents - Section 504.10 through 504.10.3

Flame- and ember-resistant vents are required to be listed. Currently, only vents in a vertical orientation are listed. Where vents are installed in other than by the OSFM Building Materials Listing Program, will be required for all attic and crawl space vents.

Accessory Structures - Section

The following table helps visualize the resultant requirements.

NIST Technical note 2205 explains how the mitigation of accessory structures help in hardening a building in the wildland area.

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Bibliography: Construction costs for a wildfire-resistant home: California edition - Headwaters Economics

Fire Research Division | NIST

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

Attached Files

- **accessory table.jpg**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4420/
- **NIST.TN.2205.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4412/
- **2017 fire data.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4406/
- **2022_HE_IBHS_WildfireConstruction reduced.pdf**
  https://www.cdpaccess.com/proposal/10556/30799/files/download/4405/

WUIC54-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The comparison between California and the many other states that have just adopted the code and what their results are. There is a lot of information in the proposal and there was a lot of attempts at making modifications that the committee really did not want to try to do. The desire to see the proposal, along with what has been already approved, being combined into the proposal in some way, shape or form, or take out those

things that has already addressed. The reason for this is that the proposal is confusing, and it is difficult to prepare a position for it with all the other changes being made by other proposals. The code is not broken the way it is now. There are enhancements forthcoming and going through and affordable housing, which this country desperately needs, especially for lower to median incomes, this proposal works against these objectives. Using these standards, a lot of multifamily housing is to the point where you have already got automatic fire sprinklers and you are just adding more and more building standards on top, and it is tough to compete. It just has to be added a little bit slower or it is really going to be tough for affordable housing if they have to build in these areas and at the same time try to be cost effective, keep rents down for residents. (Vote: 11-2)

WUIC54-24

Individual Consideration Agenda

Comment 1:

IWUIC: 504.2, 504.2.1, 504.2.2, 504.5, 504.6, 504.7, 504.7.1, 504.7.3.2, 504.7.3.4, 504.9, 504.9.1, 504.9.2, 504.10, 504.10.1, 504.10.3, 504.11, UL Chapter 07 (New)

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

504.2 Roof assembly. Roofs shall have a *roof assembly* that complies with a Class A fire classification when tested in accordance with ASTM E108 or UL 790. . **Exceptions:** The following assemblies are exempt from testing and shall be considered as a classification equivalent to Class A.

1. ~~Class A *roof*~~ *Roof assemblies* include those with coverings of brick, masonry or an exposed concrete *roof deck*.
2. ~~Class A *roof*~~ *Roof assemblies* also include with ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. ~~Class A *roof*~~ *Roof assemblies* include minimum 16 oz/sq ft (0.0416 kg/m^2) copper sheets installed over combustible *roof decks*.
4. Roof assemblies of slate roof covering over ASTM D226, Type II underlayment over combustible decks.

504.2.1 Roof covering gaps. ~~Roof covering gaps and voids~~ Where there is a void under the roof covering it shall be protected as follows:

1. Where the roofing is installed over a combustible deck, and the roofing ~~covering~~ profile ~~has~~ creates an airspace under the roof covering, the installation shall comply with the following: ~~and is installed over a combustible deck, the combustible deck shall be protected by any of the following~~:
   1.1 Install a 72-pound (32.7 kg) cap sheet, complying with ASTM D3909, over the roof deck.
   1.2 Install mineral wool board or other noncombustible material with a minimum thickness of 1 inch (25.4 mm) between the roofing material and the wood framing or deck.
   1.3 Install a Class A fire classification roof underlayment, tested in accordance with ASTM E108 or UL 790. If the sheathing consists of exterior fire-retardant treated wood, the underlayment shall not be required to comply with a Class A classification.

2. Bird stops shall be used at the eaves, when the profile fits, to prevent debris from entering at the eave. Hip and ridge caps shall be mudded to prevent intrusion of fire or embers.

504.2.2 Roof valleys. Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.7 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.

504.5 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. 1-hour *fire-resistance-rated construction* .
2. *Approved noncombustible* materials.
3. Heavy timber. Assembly of sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks splined, tongue-and-grove or set close together and well spiked.
4. Log wall construction. Assembly that has been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.
5. Wall assemblies suitable for exterior fire exposure containing one layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior wall covering or cladding on the exterior side of the framing.
6. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.
7. Ignition-resistant materials complying with Section 503.2 .

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

504.6 Underfloor enclosure. Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

Revise as follows:

504.7 Projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, other than decks, shall be *heavy timber construction* or constructed of one of the following:

1. Noncombustible materials.
2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
3. Ignition-resistant building materials in accordance with Section 503.2.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119, or UL 263 applied to the underside of the ceiling assembly, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor projection assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

504.7.1 Underside of projections.

The underside of projections shall be enclosed to grade in accordance with the requirements of this chapter or the underside of the exposed underfloor shall be protected by one or more of the following:

Exception: Structural columns and beams are not required to be protected in accordance with Section 504.7.1 when constructed with sawn lumber or glue-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). Sawn or glue-laminated planks shall be splined, tongue-and-groove, or set close together and well spiked.

1. Noncombustible material.
2. The ignition-resistant material shall be labeled for exterior use and shall meet the requirements of Section 503.2.
3. The fire-retardant-treated wood shall be labeled for exterior use and shall meet the requirements of Section 2303.2 of the International Building Code.
4. Materials approved for not less than 1-hour fire-resistance-rated construction on the exterior side, as tested in accordance with ASTM E119 or UL 263.
5. One layer of 5/8-inch (15.9 mm) Type X gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
6. The exterior portion of a 1-hour fire-resistance-rated exterior assembly, as tested in accordance with ASTM E119 or UL 263, applied to the underside of the floor, including assemblies using the gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
7. The underside of a floor assembly that meets the performance criteria in Section 504.7.2 when tested in accordance with the test procedures set forth in ASTM E2957.

504.7.3.2 Decking surfaces. The walking surface material of decks, porches, balconies and stairs shall be constructed with any of the following materials:

1. Material that complies with the performance requirements of Section 504.7.3.3.
2. Ignition-resistant material that complies with the performance requirements of Section 504.7.2.
3. Fire-retardant-treated wood labeled for exterior use and shall meet the requirements of section 2302 of the International Building Code.
4. Noncombustible material.
5. ~~Any material that complies with the performance requirements of Section 504.7.3.4 when tested in accordance with ASTM E2632 provided that any attached exterior wall covering is noncombustible or ignition-resistant materials.~~ ~~**Exception:** Wall material shall be permitted to be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread index.~~

504.7.3.4 Performance requirements for Section 504.7.3.2, Item 5. The ASTM E2632 test shall be conducted on a minimum of three test specimens and meet the condition of acceptance in Item 1 below. If any one of the three tests does not meet the condition of acceptance, three additional tests shall be performed. All three additional tests must show a peak heat release rate shall be 25 kW/ft² (269 kW/ m²) or less.

Revise as follows:

504.9 Exterior doors. Exterior doors shall be constructed in accordance with any of the following:

1. Noncombustible construction.
2. Solid-core wood not less than $1\frac{3}{4}$ inches thick (44 mm).
3. Have a fire protection rating of not less than 20 minutes when tested according to NFPA 252, UL10B or UL10C.

4. The exterior door shall be constructed of solid core wood that complies with the following requirements:
    4.1. Stiles and rails shall not be less than 1 3/8 inches (35 mm) thick.
    4.2. Raised Panels shall not be less than 1¼ inches (32mm) thick, except for the exterior perimeter of the panel that shall be permitted to taper to a tongue not less than 3/8 inch (35 mm) thick.
5. The exterior surface or cladding shall be tested to meet the performance requirements of Section 504.9.3 when tested in accordance with ASTM E2707 with the conditions of acceptance shown in Section 504.9.3.

Windows within doors and exterior glazed doors shall be in accordance with Section 504.8.

504.9.1 Garage doors. Automatic garage door openers for vehicle doors serving a residential building shall be equipped with a battery backup function.

504.9.2 Garage door perimeter gap. Exterior garage doors shall resist the intrusion of embers from entering by preventing gaps between doors and door openings, at the bottom, sides and tops of doors, from exceeding ⅛ inch (3.2 mm). Gaps between doors and door openings shall be controlled by one of the following methods:

1. Weather-stripping products shall be constructed of materials which comply with both of the following:
    1.1. The tensile strength of the material shall be tested in accordance with ASTM D638 before and after exposure to ASTM G155 for a period of 2,000 hours, and the maximum allowable difference in tensile strength values between exposed and non-exposed samples shall not exceed 10 percent.
    1.2. When tested to UL 94, the materials shall have a flammability rating of V-2 or better.
2. Door overlaps onto jambs and headers.
3. Garage door jambs and headers covered.

504.10 Vents. Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 504.10.1 or Section 504.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

504.10.1 Performance requirements. Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

504.10.3 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

504.11 Accessory buildings and miscellaneous structures. Accessory buildings and miscellaneous structures shall be constructed to conform to the ignition-resistance requirements of Sections 504.11.1 through 504.11.6.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

10B—2008	Fire Tests of Door Assemblies—with Revisions through May 2020
10C—2016	Positive Pressure Fire Tests of Door Assemblies—with Revisions through May 2021

Reason: The proposed revisions are based on the CAH1 testimony and coordination with other IWUIC-approved proposals.

Bibliography: Same as original proposal

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Same as the original proposal. the revisions are coordination and editorial in nature

Comment (CAH2)# 795

WUIC55-24

IWUIC: SECTION 505, 505.1, 505.2, 505.2.1, 505.3, 505.4, 505.5, 505.6, 505.7, 505.7.1, 505.8, 505.9, 505.10, 505.10.1, 505.10.2, 505.10.3, 505.11, 505.11.1, SECTION 506, 506.1, 506.2, 506.2.1, 506.3, 506.4, 506.5

Proposed Change as Submitted

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov)

2024 International Wildland Urban Interface Code

Delete without substitution:

~~SECTION 505~~
~~CLASS 2 IGNITION-RESISTANT CONSTRUCTION~~

Revise as follows:

~~**505.1 General.** Class 2 ignition-resistant construction shall be in accordance with Sections 505.2 through 505.11.~~

~~**505.2 Roof assembly.** Roofs shall have a *roof assembly* that complies with not less than a Class A rating when tested in accordance with ASTM E108 or UL 790, or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

~~**505.2.1 Roof valleys.** Where provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.~~

~~**505.3 Protection of eaves.** Combustible eaves, fascias and soffits shall be enclosed with solid materials with a minimum thickness of $^{3}/_{4}$ inch (19 mm). Exposed rafter tails shall not be permitted unless constructed of heavy timber materials.~~

~~**505.4 Gutters and downspouts.** Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.~~

~~**505.5 Exterior walls.** Exterior walls of buildings or structures shall be constructed with one of the following methods:~~

1. ~~Materials *approved* for not less than 1-hour *fire-resistance-rated construction* on the exterior side.~~
2. ~~*Approved noncombustible* materials.~~
3. ~~*Heavy timber* or *log wall construction*.~~
4. ~~Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~
5. ~~Ignition-resistant materials on the exterior side.~~

~~Such material shall extend from the top of the foundation to the underside of the roof sheathing.~~

~~**505.6 Underfloor enclosure.** Buildings or structures shall have underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or *heavy timber construction* or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for~~

exterior use and meet the requirements of Section 2303.2 of the International Building Code.

505.7 Appendages and projections. *Unenclosed accessory structures* attached to buildings with habitable spaces and projections, such as decks, shall be not less than 1-hour *fire-resistance-rated construction*, *heavy timber construction* or constructed of one of the following:

1. *Approved noncombustible* materials.
2. Fire-retardant treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the International Building Code.
3. Ignition-resistant building materials in accordance with Section 503.2. **Exception:** Coated materials shall not be used as the walking surface of decks.

505.7.1 Underfloor areas. Where the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5.

505.8 Exterior glazing. Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be tempered glass, *multilayered glazed panels*, glass block or have a fire protection rating of not less than 20 minutes.

505.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid core wood not less than $1\frac{3}{4}$ inches thick (45 mm), or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8. **Exception:** Vehicle access doors.

505.10 Vents. Where provided, ventilation openings for enclosed attics, gable ends, ridge ends, under eaves and cornices, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, underfloor ventilation, foundations and crawl spaces, or any other opening intended to permit ventilation, either in a horizontal or vertical surface, shall be in accordance with Section 505.10.1 or Section 505.10.2 to resist building ignition from the intrusion of burning embers and flame through the ventilation openings.

505.10.1 Performance requirements. Ventilation openings shall be fully covered with listed vents, tested in accordance with ASTM E2886, to demonstrate compliance with all the following requirements:

1. There shall be no flaming ignition of the cotton material during the Ember Intrusion Test.
2. There shall be no flaming ignition during the Integrity Test portion of the Flame Intrusion Test.
3. The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

505.10.2 Prescriptive requirements. Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical or horizontal surfaces and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.

505.10.3 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves or in other overhang areas. Gable-end and dormer vents shall be located not less than 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.11 Detached accessory structures. Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for not less than 1-hour *fire-resistance-rated construction*, heavy timber, *log wall construction*, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

505.11.1 Underfloor areas. Where the detached *accessory structure* is located and constructed so that the structure or any portion

~~thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5 or underfloor protection in accordance with Section 505.6.~~ ~~**Exception:** The enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction* or heavy-timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

Delete without substitution:

~~SECTION 506~~
~~CLASS 3 IGNITION-RESISTANT CONSTRUCTION~~

Revise as follows:

~~**506.1 General.** Class 3 ignition-resistant construction shall be in accordance with Sections 506.2 through 506.4.~~

~~**506.2 Roof assembly.** Roofs shall have a *roof assembly* that complies with not less than a Class B rating when tested in accordance with ASTM E108 or UL 790 or an *approved noncombustible roof covering*. For *roof assemblies* where the profile allows a space between the *roof covering* and *roof deck*, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of cap sheet complying with ASTM D3909 installed over the combustible *roof deck*.~~

~~**506.2.1 Roof valleys.** Where provided, valley flashings shall be not less than 0.019 inch (0.44 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D3909 running the full length of the valley.~~

~~**506.3 Underfloor enclosure.** Buildings or structures shall have underfloor areas enclosed to the ground with exterior walls. **Exception:** Complete enclosure shall not be required where the underside of exposed floors and exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour *fire-resistance-rated construction*, fire-retardant-treated wood or *heavy-timber construction*. Fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.~~

~~**506.4 Gutters and downspouts.** Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.~~

~~**506.5 Vents.** Where provided, attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/8 inch (3.2 mm) or shall be designed and approved to prevent flame or ember penetration into the structure.~~

Reason: This code change is to propose one construction method for building and structures in the wildland area. This is the companion to another proposal to delete sections 505 and 506 with the intent to remove Ignition Resistant Construction Classes II and III. Replacing these classifications will be a single defined Ignition Resistant Construction as provided by Section 504 of this code. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

1. Protect lives and property within the Wildland-Urban Interface areas

2. Provide clear and consistent standards, simplifying the construction process

3. Providing a minimum standard of protection, with appendices providing potential pathways for increased protection beyond the minimum

Findings during a NIST case study of the 2018 Camp Fire (https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf) found that

a primary factor in fire spread was significant ember exposure. As stated in the case study "In agreement with the other NIST case studies of WUI fires, the Camp Fire has demonstrated that embers can have significant impact on WUI communities. Laboratory and field work by NIST [57] has demonstrated that embers with enough energy to cause ignitions are readily generated from parcel-level combustibles such as landscaping mulch, fences, and firewood piles. These parcel-level fuels can cause ignitions over 40 m (130 ft) downwind. Ember ignitions downwind from parcel-level combustibles enable fire to readily spread from parcel to parcel. In high hazard areas, WUI structures therefore need to be able to withstand the exposures generated from both wildland and parcel-level combustibles." (A Case Study of the Camp Fire, pg.141)

Given that this far distances that embers can travel, this minimum standard of protection should be across the Wildland-Urban Interface areas; regardless of whether they have been designated as Moderate, High or Extreme hazards. In an analysis of California structures damaged by wildfire in 2017 found that of more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed. 92% of damaged structures being destroyed in moderate fire hazard severity zones. 86% of damaged structures being destroyed in very high fire hazard severity zones. This data indicates that the requirements proposed in 504 which mirror the California 7A requirements are working.

In an analysis of California structures damaged by wildfire in 2017 found that of more homes were damaged in the areas designated as moderate fire hazard severity (3645 damaged) than those damaged in areas designated as very high fire hazard severity (2215 damaged). Of those damaged, a similar percentage of those structures were recorded as destroyed. 92% of damaged structures being destroyed in moderate fire hazard severity zones. 86% of damaged structures being destroyed in very high fire hazard severity zones.

Whereas the designated fire hazard severity zone did not play a large determining factor in whether a structure was damaged or destroyed, the date of construction did play a large role. In 2017, 33,508 structures that were constructed prior to 2009 were damaged in wildfires. In the same year, only 592 structures that were built after 2009 were damaged or destroyed by wildfire. The year 2009 is significant as it was the first full year that structures build in Wildland-Urban Interface areas were required to comply with California Building Code, Chapter 7A requirements. This data indicates that the requirements proposed in 504 which mirror the California 7A requirements are working.

Construction Costs for a Wildfire Resistant Home, California Edition (headwaterseconomics.org)

The Headwaters Economics study by the Insurance Institute for Business & Home Safety outlines that California's Chapter 7A requirements are a minimum. If there is a proposal for three construction versions, using the proposed code provisions as the minimum with an enhanced version and an optimum version for best performance standards. "In preliminary research conducted by Baylis and Boom hower (2021), the authors examined home survivability factors for nearly 50,000 homes exposed to wildfires between 2007 and 2020 across California.30 The authors reported that a home built in 2010 or later was nearly 40% less likely to be destroyed by a wildfire compared to a home built in 1985 or before. Home survivability was closely correlated to modern building codes requiring homeowner mitigation measures. Additionally, a home was more likely to survive if its nearest neighbor also complied with recent mitigation regulations resulting in a positive net spillover effect for the larger neighborhood.

Roof

Roofs are highly vulnerable to ignition due to their relatively large horizontal surface area. The exposure of roof coverings to a range of climatic conditions, including wind, rain, and sun, means the roof covering will require maintenance and eventual replacement. Many Class A fire-rated roof covering options are available (e.g., asphalt fiberglass composition shingles). A main reason the roof is vulnerable is because the roof edge—including gutters and roof-to-wall intersections where roof covering meets other materials (e.g., siding used in dormers and split-level homes)—is exposed to ember ignitions. These areas must be properly protected by adding additional flashing t roof-to-wall locations.

Under-Eave Area

Research suggests eaves are extremely important in structure survivability.1 Eaves play an important role for building design but they also create vulnerabilities and pathways for the building to ignite. Embers can travel through vents in the eave into the attic and accumulate in gaps between blocking and rafters in open-eave construction. Should flames reach the under-eave area, open eaves can also trap heat. Once there is an ignition in the under-eave area, fire will spread laterally more quickly.

Vents in the under-eave area are inlet vents and therefore allow air to enter the attic space. During a wildfire, vent openings can allow the entry of wind-blown embers into the interior attic space. If combustible materials in the attic ignite, the house can burn from the inside out.2 The importance of ember and flame entry through vents during a wildfire, and as per requirements in Chapter 7A, have resulted in the development of vents designed to resist the intrusion of flames and embers.

Exterior Wall

Exterior walls and components in the wall assembly can be vulnerable if exposed to embers, flames, or prolonged exposure to radiant heat from burning items located close to the home. These exposures can ignite combustible siding and the resulting flames can spread vertically and laterally to other wall components such as windows and the under-eave area. Siding extending close to the ground can be vulnerable to ignition by embers accumulating at the base of the wall that ignite it or components in the wall assembly (e.g., wood sheathing).

Attached Deck

Similar to a roof, a deck can cover a large horizontal surface area and can be vulnerable to embers and under-deck flame impingement exposures. A burning deck can expose the side of the house to extended radiant heat and/or direct flame contact. The deck walking surface and structural support members, as well as what is stored on or below the deck are therefore important considerations.

Most commonly used deck board products (including wood and plastic composite boards) are combustible. Decks with noncombustible walking surfaces include lightweight concrete or a flagstone product. Regardless of the walking surface, decks are typically supported by solid wood joists, beams, and columns that will be vulnerable to ignition if nearby combustible materials ignite. Enclosing the under-deck area vertically around the perimeter can minimize the accumulation of vegetative debris, vegetation, and other combustible materials. For enclosed decks, installing vents to ensure that excessive moisture does not accumulate in the under-deck area is critical to avoid moisture-related degradation.

Glazing Window manufacturers and suppliers indicated that whereas Chapter 7A only requires one pane in a dual-paned window to be tempered, many window manufacturers only supply windows with both panes tempered. Other manufacturers will supply what the customer requests but will default to one-pane tempered. Since all comparative versions of the wildfire-resistant home are Chapter 7A-compliant, the price of windows would not result in a net cost difference.

Doors

Doors (including window glass set in doors) and door frames can fail for the same reasons as windows. Embers can accumulate in the small gaps between the door and frame, resulting in ignition of the door-framing and weather-sealing material. Vents: Flame- and ember-resistant vents, approved and listed by the OSFM Building Materials Listing Program, will be required for all attic and crawlspace vents. Separation Distance from accessory structures NIST Technical note 2205 explains how the mitigation of accessory structures help in hardening a building in the wildland area.

https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2205.pdf

Bibliography: https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2135.pdf
https://headwaterseconomics.org/natural-hazards/wildfire-resistant-costs-california/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Construction costs for a typical single-family (1,750 square-foot) home would increase approximately $2,000 including developer overhead costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

In 2004, and as a precursor to California adopting Building Code Chapter 7A, the Office of the State Fire Marshal requested an analysis identifying the costs and benefits associated with proposed regulations in the state's wildfire-prone areas. The study was conducted by Fire Cause Analysis and evaluated economic and construction data within various business sectors to analyze construction costs if proposed regulations were implemented.33 The study found construction costs for a typical single-family (1,750 square-foot) home

would increase approximately $2,000 including developer overhead costs. As an aggregated total at the state level, construction costs would increase approximately $30 million per year for the estimated 14,000 new homes built in areas where regulations would apply. The authors concluded the costs of not implementing regulations, in the form of property losses and suppression costs, exceeded the projected costs for regulations and therefore recommended adopting mitigation standards in wildfire-prone areas.

In 2019, the National Institute of Building Sciences (NIBS) released a report identifying the benefit-cost ratio (BCR) of investing in hazard mitigation, including wildfires.35 The authors found that for every $1 spent on up-front costs for wildfire mitigation, a benefit of $4 was received.

In 2021, the National Research Council of Canada released a study analyzing the benefit-cost ratio for building new construction to comply with the country's wildland urban interface (WUI) Guide.38 In its examination, approximately $12,000 CAD (~$9,500 USD) was added to the overall costs for a new, 2,000-square-foot home to meet the provision of Canada's National WUI Guide. The comprehensive report also examined costs for retrofitting existing structures, as well as transferred costs at the community and national scale. Similar to the NIBS study in 2019, the NRC report found an up-front investment in wildfire-resistant construction and vegetation management yielded benefits that exceeded long-term costs and losses.

WUIC55-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The concern about the use of the code in states other than California and the negative impact of limiting the construction options in these locations with different types and levels of hazard. The desire to have more data to reinforce the deletions. The preference is to make smaller incremental changes instead of larger wholesale changes for the locations that are a little slower in adopting the code. (Vote: 11-2)

WUIC55-24

Individual Consideration Agenda

Comment 1:

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov) requests As Submitted

Reason: same as original proposal

Bibliography: same as orininal propoasl

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 804

Comment 2:

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org) requests As Submitted

Reason: This code change is to propose one construction method for building and structures in the wildland area. This is the companion to another proposal to delete sections 505 and 506 with the intent to remove Ignition Resistant Construction Classes II and III. Replacing these classifications will be a single defined Ignition Resistant Construction as provided by Section 504 of this code. As the IWUIC is intended to provide a minimum standard of protection for the Wildland-Urban Interface areas, a single classification of Ignition Resistant Construction should be provided to accomplish the following goals:

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https://headwaterseconomics.org/natural-hazards/wildfire-resistant-costs-california/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 775

WUIC60-24

IWUIC: SECTION 603, 603.1, 603.2, TABLE 603.2, FIGURE 603.2, 603.2.1, 603.2.2, 603.2.3, 603.1 (New), 603.2 (New), 603.3 (New), 603.3.1 (New), 603.4 (New), 603.4.1 (New), 603.4.2 (New), 603.4.2.1 (New)

Proposed Change as Submitted

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

SECTION 603
~~DEFENSIBLE SPACE~~ VEGETATION PLAN

603.1 ~~Objective.~~ ~~Provisions of this section are intended to modify the fuel load in areas adjacent to structures to create a *defensible space*~~

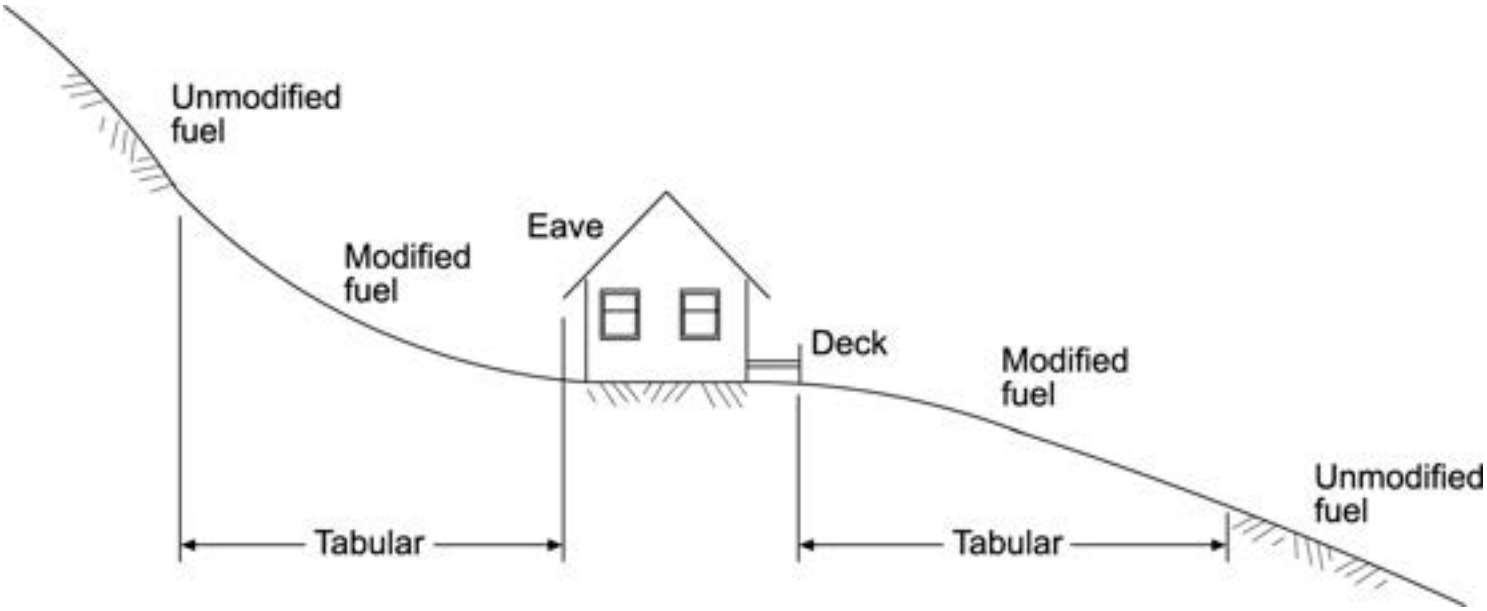
~~603.2~~ ~~Fuel modification.~~ ~~Buildings or structures, constructed in compliance with the conforming *defensible space* category of Table 503.1, shall comply with the *fuel modification* distances contained in Table 603.2. For all other purposes the *fuel modification* distance shall be not less than 30 feet (9144 mm) or to the lot line, whichever is less. Distances specified in Table 603.2 shall be measured on a horizontal plane from the perimeter or projection of the building or structure as shown in Figure 603.2. Distances specified in Table 603.2 are allowed to be increased by the *code official* because of a site-specific analysis based on local conditions and the *fire protection plan*.~~

~~TABLE 603.2 REQUIRED DEFENSIBLE SPACE~~

~~WILDLAND-URBAN INTERFACE AREA~~	~~FUEL MODIFICATION DISTANCE (feet)[a]~~
~~Moderate hazard~~	~~30~~
~~High hazard~~	~~50~~
~~Extreme hazard~~	~~100~~

~~For SI: 1 foot = 304.8 mm.~~

~~a. Distances are allowed to be increased due to site-specific analysis based on local conditions and the *fire protection plan*.~~



~~**FIGURE 603.2 MEASUREMENTS OF FUEL MODIFICATION DISTANCE**~~

~~**603.2.1 Responsible party.** Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing nonfire-resistive vegetation on the property owned, leased or controlled by said person.~~

~~**603.2.2 Trees.** Trees are allowed within the *defensible space*, provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures, overhead electrical facilities or unmodified fuel is not less than 10 feet (3048 mm).~~

~~**603.2.3 Ground cover.** Deadwood and litter shall be regularly removed from trees. Where ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants are used as ground cover, they are allowed to be within the designated *defensible space*, provided that they do not form a means of transmitting fire from the native growth to any structure.~~

Add new text as follows:

603.1 General. Planting of vegetation for new landscaping shall be selected to reduce vegetation in proximity to a structure and to maintain vegetation as it matures.

603.2 Application. All new plantings of vegetation in designated Wildland-Urban Interface areas shall comply with Sections 603.3 through 603.4.2.1.

603.3 Landscape plans. Landscape plans shall be provided when required by the enforcing agency. The landscape plan shall include development and maintenance requirements for the vegetation management zone adjacent to structures and roadways, and to provide significant fire hazard reduction benefits for public and firefighting safety.

603.3.1 Contents. In addition to the construction site plan as outlined in the *International Building Code* landscape plans shall contain the following:

1. Delineation of the 30-foot (9144 mm) and 100-foot (3048 mm) fuel management zones from all structures.

2. Identification of existing vegetation to remain and proposed new vegetation.

3. Identification of irrigated areas.

4. A plant legend with both botanical and common names, and identification of all plant material symbols.

5. Identification of ground coverings within the 30-foot (9144 mm) zone.

603.4 Vegetation. All new vegetation shall be fire-smart vegetation in accordance with this section. **Exception:** Trees classified as fire-smart vegetation complying with Section 603.4.2.1. To be considered fire-smart vegetation, it must meet at least one of the following:

1. Be identified as fire-smart vegetation in an approved book, journal or listing from an approved organization.

2. Be identified as fire-smart vegetation by a licensed landscape architect with supporting justification.

3. Plants considered fire-smart vegetation and approved by the local enforcing agency.

603.4.1 Shrubs. All new plantings of shrubs shall comply with the following:

1. Shrubs shall not exceed 6 feet (1829 mm) in height.

2. Groupings of shrubs are limited to a maximum aggregate diameter of 10 feet (3048 mm).

3. Shrub groupings shall be separated from other groupings a minimum of 15 feet (4572 mm).

4. Shrub groupings shall be separated from structures a minimum of 30 feet (9144 mm).

5. Where shrubs are located below or within a tree's drip line, the lowest tree branch shall be a minimum of three times the height of the understory shrubs or 10 feet (3048 mm), whichever is greater.

603.4.2 Trees. Trees shall be managed as follows within the 30-foot zone (9144 mm) of a structure:

1. New trees shall be planted and maintained so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure.

2. The horizontal distance between crowns of new trees and crowns of adjacent trees shall not be less than 10 feet (3048 mm).

3. Existing trees shall be trimmed to provide a minimum separation of 10 feet (3048 mm)away from chimney and stovepipe outlets

603.4.2.1 Non-fire-smart vegetation. New trees not classified as fire-smart vegetation, such as conifers, palms, pepper trees and eucalyptus species, shall be permitted provided the tree is planted and maintained so that the tree's drip line at maturity is a minimum of 30 feet from any combustible structure. **Exception:** New, single specimen trees, planted so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure and are well pruned and maintained to not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation or to interrupt the advance of embers toward a structure.

Reason: The proposal to relocate section "Defensible Space" to follow the newly created section titled "Vegetation Plan" focuses on the planting of vegetation for new landscaping and to maintain defensible space for structures within the wildland urban interface areas. Chapter 5 of the Wildland Urban Interface Code requires vegetation management compliance prior to the final approval for building permits issued, this new section will give guidance on how to comply with the vegetation plan compliance when new landscaping is planted in these areas.

This section will apply only to new plantings of vegetation (other than a brief mention of existing trees in section 603.4.2) only in the Wildland Urban Interface area. Existing vegetation management is addressed in the Defensible Space section.

Requirements for landscape plans are laid out in this section. Since many local fire departments manage the Vegetation Plan Compliance requirements through submittals of landscape plans, there is a need for language to spell out the minimum requirements. This section provides these requirements to ensure adequate information is provided on the plans to conduct a plan review. Defensible space and Vegetation Management go hand in hand. Defensible space is based on the location of the structures in relation to the property lines as well as manmade and natural fire breaks. These topographic features are an essential factor in determining the risks of wildfire spread.

It also addresses how to select fire smart vegetation and provide basic information on planting to ensure that as the plantings grow to maturity, they can be maintained per the section for the Defensible Space requirements. Specifically addressed are shrubs and trees. The intention for shrubs is to select fire-smart species and to purposefully plant them in groupings and arrangements that ensure they create a landscape that can be easily maintained as they grow. Similarly with shrubs, new tree plantings must also be carefully considered. Trees have the added ability to create a pathway that will lead a fire up to the most vulnerable portions of a house (eaves, vents, and roofs), but also considered was the understanding that trees can provide much needed shade and can prevent the "urban heat island" effect.

The existing tree requirements that are briefly mentioned in this section because it will be very likely existing trees will be part of a new landscape plan as property owners landscape their yards.

Unique to the trees section are the requirements for non-fire-smart vegetation. Since so many of the popular varies of trees may not qualify for fire-smart status, requirements for non-fire-smart vegetation are also found in the trees section. The requirement for non-fire-smart vegetation is to simply plant them further away from structures to mitigate the additional hazard these trees may bring. This subsection allows property owners to have a path of compliance when they have a robust maintenance plan in place. The exception allows for small lots to have some kind of landscaping closer to the structure. The spacing an maintenance are the most important factors. Tree species become secondary when the spacing and maintenance are in compliance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 or it may increase of the cost of construction dependent upon the landscaping material and vegetation selected to comply with this section.

Estimated Immediate Cost Impact Justification (methodology and variables):

It is a property owners design choices that will determine the cost of landscaping. With many variables of cost per region and area will be driven by the local contractor, supply and demand.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Agreement that the requirements might be more appropriately located in an appendix. There was a request from the committee to see some more information and reasoning with regards to some of the prescriptive requirement such as the spacing. The need for language cleanup that could be done throughout the proposal that was brought up in the testimony. The cost impact statement was questioned and that there is a need for more information. The intent is going in the right direction, but there is a need to see a little bit more correlation with the vegetation management plan and the fire protection plan. (Vote: 12-1)

WUIC60-24

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 603, 603.1, 603.2, 603.2.1, 603.2.2, 603.2.3, FIGURE 603.2, TABLE 603.2, 603.3, 603.3.1, 603.4, 603.4.1, 603.4.2, 603.4.2.1

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CALFIRE/Office of the State Fire Marshal, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

SECTION 603
DEFENSIBLE SPACE

603.1 Objective. Provisions of this section are intended to modify the fuel load in areas adjacent to structures to create a *defensible space*.

603.2 Fuel modification. Buildings or structures, constructed in compliance with the conforming *defensible space* category of Table 503.1, shall comply with the *fuel modification* distances contained in Table 603.2. For all other purposes the *fuel modification* distance shall be not less than 30 feet (9144 mm) or to the lot line, whichever is less. Distances specified in Table 603.2 shall be measured on a horizontal plane from the perimeter or projection of the building or structure as shown in Figure 603.2. Distances specified in Table 603.2 are allowed to be increased by the *code official* because of a site-specific analysis based on local conditions and the *fire protection plan*.

603.2.1 Responsible party. Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing nonfire-resistive vegetation on the property owned, leased or controlled by said person.

603.2.2 Trees. Trees are allowed within the *defensible space*, provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures, overhead electrical facilities or unmodified fuel is not less than 10 feet (3048 mm).

603.2.3 Ground cover. Deadwood and litter shall be regularly removed from trees. Where ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants are used as ground cover, they are allowed to be within the designated *defensible space*, provided that they do not form a means of transmitting fire from the native growth to any structure.

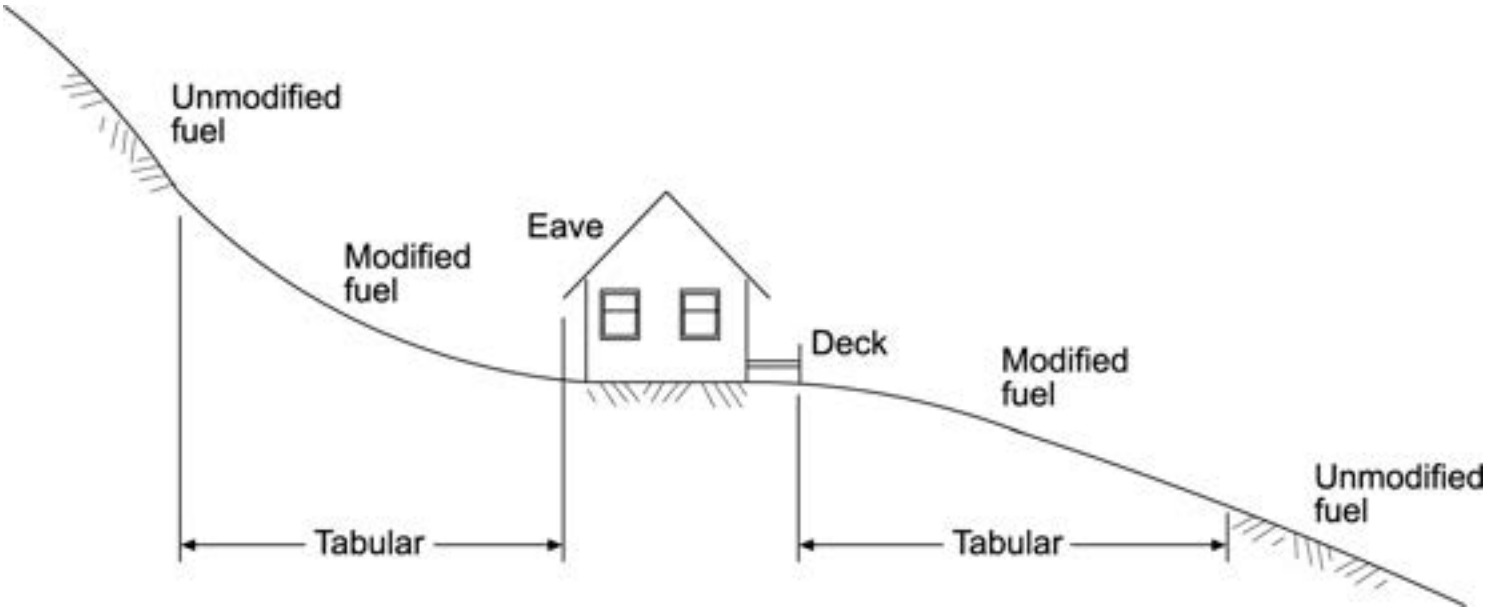


FIGURE 603.2 MEASUREMENTS OF FUEL MODIFICATION DISTANCE

TABLE 603.2 REQUIRED DEFENSIBLE SPACE

WILDLAND-URBAN INTERFACE AREA	FUEL MODIFICATION DISTANCE (feet)[a]
Moderate hazard	30
High hazard	50
Extreme hazard	100

For SI: 1 foot = 304.8 mm.

a. Distances are allowed to be increased due to site-specific analysis based on local conditions and the *fire protection plan*.

Revise as follows:

SECTION ~~603~~ 604
VEGETATION PLAN

~~**603.1**~~ **604.1 General.** Planting of vegetation for new landscaping shall be selected to reduce vegetation in proximity to a structure and to maintain vegetation as it matures.

~~**603.2**~~ **604.2 Application.** All new plantings of vegetation in designated Wildland-Urban Interface areas shall comply with Sections 604.3 through 604.4.2.1.

~~**603.3**~~ **604.3 Landscape plans.** Landscape plans shall be provided when required by the enforcing agency. The landscape plan shall include development and maintenance requirements for the vegetation management zone adjacent to structures and roadways, and to provide significant fire hazard reduction benefits for public and firefighting safety.

~~**603.3.1**~~ **604.3.1 Contents.** In addition to the construction site plan as outlined in the *International Building Code* landscape plans shall contain the following:

1. Delineation of the 30-foot (9144 mm) and 100-foot (3048 mm) fuel management zones from all structures.

2. Identification of existing vegetation to remain and proposed new vegetation.

3. Identification of irrigated areas.

4. A plant legend with both botanical and common names, and identification of all plant material symbols.

5. Identification of ground coverings within the 30-foot (9144 mm) zone.

~~603.4~~ 604.4 **Vegetation.** All new vegetation shall be fire-smart vegetation in accordance with this section.

Exception: Trees classified as non-fire-smart vegetation complying with Section 604.4.2.1.

To be considered fire-smart vegetation, it must meet at least one of the following:

1. Be identified as fire-smart vegetation in an approved book, journal or listing from an approved organization.

2. Be identified as fire-smart vegetation by a licensed ~~landscape architect~~ professional with supporting justification.

3. Plants considered fire-smart vegetation and approved by the local enforcing agency.

~~603.4.1~~ 604.4.1 **Shrubs.** All new plantings of shrubs shall comply with the following:

1. Shrubs shall not exceed 6 feet (1829 mm) in height.

2. Groupings of shrubs are limited to a maximum aggregate diameter of 10 feet (3048 mm).

3. Shrub groupings shall be separated from other groupings a minimum of 15 feet (4572 mm).

4. Shrub groupings shall be separated from structures a minimum of 30 feet (9144 mm).

5. Where shrubs are located below or within a tree's drip line, the lowest tree branch shall be a minimum of three times the height of the understory shrubs or 10 feet (3048 mm), whichever is greater.

~~603.4.2~~ 604.4.2 **Trees.** Trees shall be managed as follows within the 30-foot zone (9144 mm) of a structure:

1. New trees shall be planted and maintained so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure.

2. The horizontal distance between crowns of new trees and crowns of adjacent trees shall not be less than 10 feet (3048 mm).

3. Existing trees shall be trimmed to provide a minimum separation of 10 feet (3048 mm)away from chimney and stovepipe outlets

~~603.4.2.1~~ 604.4.2.1 **Non-fire-smart vegetation.** New trees not classified as fire-smart vegetation, such as conifers, palms, pepper trees and eucalyptus species, shall be permitted provided the tree is planted and maintained so that the tree's drip line at maturity is a minimum of 30 feet from any combustible structure.

Exception: New, single specimen trees, planted so that the tree's drip line at maturity is a minimum of 10 feet (3048 mm) from any combustible structure and are well pruned and maintained to not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation or to interrupt the advance of embers toward a structure.

Reason: The intent of this comment is to restore Section 603 "Defensible Space". It was not the intent of the original proposal WUI60-24 to eliminate Defensible Space from the code. This comment includes the movement of the proposed "Vegetation Plan" to its own Section following directly after Section 603 "Defensible Space".

Based upon the comments of the committee during the first hearing, Section 604.4 has been modified to reflect the following changes.

The exception with 604.4 now reads "non-fire smart vegetation" to better coordinate the exception with Section 604.4.2.1. The subject of Section 604.4.2.1 is "non-fire smart vegetation" which was not reflected in the text of the original proposal.

In item 2 of Section 604.4, the term "licensed landscape architect" has been changed to "licensed professional". This modification was made to address a concern by the committee that the original language may have only been applicable in certain regions. The change is also reflective of a floor modification that was made during the first committee hearing.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 or it may increase the cost of construction dependent upon the landscaping material and vegetation selected to comply with the section.

Estimated Immediate Cost Impact Justification (methodology and variables):

It is a property owner design choices that will determine the cost of landscaping. With many variables of cost per region and area will be driven by the local contractor, supply and demand. Requirements existing within the code, (2024 IWUIC Section 604.2), already require the removal of non-fire smart vegetation within the modified defensible space.

Comment (CAH2)# 344

WUIC70-24

IWUIC: [A] 102.8, CHAPTER 7 (New), SECTION 701 (New), 701.1 (New), SECTION 702 (New), 702.1 (New), SECTION 703 (New), 703.1 (New), SECTION 704 (New), 704.1 (New), 704.2 (New), 704.3 (New), SECTION 705 (New), 705.1 (New), SECTION 706 (New), 404.9, 706.2 (New), SECTION 707 (New), 604.1, 707.1.1 (New), 604.2, 604.3, 604.4, 604.4.1, 604.4.2, 603.2.1, 707.5 (New), 707.6 (New), 707.7 (New), 603.2.3

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

[A] 102.8 Existing conditions. The legal occupancy or use of any structure ~~or condition~~ existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically ~~covered~~ provided for in this code, the International Fire Code or the *International Property Maintenance Code*, or as is deemed necessary by the *code official* for the general safety and welfare of the occupants and the public. Existing properties shall comply with the defensible space requirements in Section 603 and Chapter 7.

Add new text as follows:

CHAPTER 7
MAINTENANCE REQUIREMENTS

SECTION 701
GENERAL

701.1 Scope. Where a building or structure was constructed in accordance with this code or was previously *approved*,maintenance of new and existing buildings, structures, systems and premises shall comply with this chapter. The construction requirements of this chapter are not intended to apply retroactively.

SECTION 702
IGNITION-RESISTANT CONSTRUCTION

702.1 General. Ignition-resistant construction features found to be damaged, missing or non-compliant shall be repaired or replaced.

SECTION 703
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

703.1 General. *Fire protection* and *life safety system*s shall be maintained operable at all times in accordance with the applicable standard

SECTION 704
FIRE ACCESS ROADS

704.1 Obstructions. Fire access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Section 403.3 shall be maintained at all times.

704.2 Maintenance. Fire access roadsshall be maintained in a condition equal to or better than the condition at the time of approval.

704.3 Signs and marking. Road identification signs required in Section 403.4.1 and marking of fire protection equipment required in Section 403.5 shall be maintained and legible.

SECTION 705
PREMISES IDENTIFICATION

705.1 General. Signs and markings for premise identification required in Section 403.6 shall be maintained and legible.

SECTION 706
WATER SUPPLY

Revise as follows:

~~**404.9**~~**706.1 ~~Testing and maintenance~~General.** Water sources, draft sites, and hydrants ~~and other fire protection equipment~~ required by this code shall be subject to periodic tests as required by the *code official*. ~~Such equipment installed under the provisions of this code shall be maintained in an operative condition at all times and shall be repaired or replaced where defective. Additions, repairs, alterations and servicing of such fire protection equipment and resources shall be in accordance with *approved* standards.~~

Add new text as follows:

706.2 Maintenance. Water sources, draft sites and hydrants shall be maintained in an operative condition at all times.

SECTION 707
DEFENSIBLE SPACE AND VEGETATION MANAGEMENT

Revise as follows:

~~**604.1**~~ **707.1 General.** *Defensible spaces* required by Section 603 or by an *approved* vegetation management plan in accordance with 502.2 shall be maintained at all times in accordance with 706.2 through 706.4.2 ~~Section 604~~.

Add new text as follows:

707.1.1 Fire protection plans. Where an *approved fire protection plan* contains *defensible space* requirements other than those in Table 603.2, the *defensible space* requirements in the *approved fire protection plan* shall be maintained at all times.

Revise as follows:

~~**604.2**~~ **707.2 Modified area.** Nonfire-resistive vegetation or growth shall be kept clear of buildings or structures, in accordance with Section 603, in such a manner as to provide a clear area for fire suppression operations.

~~**604.3**~~ **707.3 Responsibility.** Persons owning, leasing, controlling, operating or maintaining buildings or structures are responsible for maintenance of *defensible spaces*. Maintenance of the *defensible space* shall include modifying or removing nonfire-resistive vegetation and keeping leaves, needles and other dead vegetative material regularly removed from roofs of buildings and structures.

~~**604.4**~~ **707.4 Trees.** Tree crowns extending to within 10 feet (3048 mm) of any structure shall be pruned to maintain a minimum horizontal clearance of 10 feet (3048 mm). Tree crowns within the *defensible space* shall be pruned to remove limbs located less than 6 feet (1829 mm) above the ground surface ~~adjacent to the trees~~.

~~604.4.1~~ 707.4.1 **Chimney clearance.** Portions of tree crowns that extend to within 10 feet (3048 mm) of the outlet of a chimney shall be pruned to maintain a minimum horizontal clearance of 10 feet (3048 mm).

~~604.4.2~~ 707.4.2 **Deadwood removed.** Deadwood and ~~litter~~ dying branches shall be regularly removed from trees.

Delete without substitution:

~~603.2.1 **Responsible party**. Persons owning, leasing, controlling, operating or maintaining buildings or structures requiring *defensible spaces* are responsible for modifying or removing nonfire-resistive vegetation on the property owned, leased or controlled by said person.~~

Add new text as follows:

707.5 Accumulation of dead vegetation. Leaves, needles, or other vegetation on roofs, in gutters, on or below decks, porches, balconies or exterior stairways shall be regularly removed.

707.6 Woodpiles. A minimum of 10 feet (3048 mm) clearance to combustible materials shall be maintained in all directions around all exposed woodpiles. **Exception:** Where an approved vegetation management plan requires a different clearance distance.

707.7 Liquid Propane Gas (LPG) storage tanks. A minimum of 10 feet clearance to combustible materials shall be maintained in all directions around aboveground Liquid Propane Gas (LPG) storage tanks. **Exception:** Where an *approved* vegetation management plan requires a different clearance distance.

Revise as follows:

~~603.2.3~~707.8 **Ground cover.** ~~Deadwood and litter shall be regularly removed from trees. Where~~ ~~o~~Ornamental vegetative fuels or cultivated ground cover, such as green grass, ivy, succulents or similar plants ~~are~~ used as ground cover, ~~they are allowed~~ shall be permitted to be within the designated *defensible space*, provided that they do not form a means of transmitting fire from the native growth to any structure.

Reason: This proposal accomplishes 3 things:

1. It creates a new Chapter for all maintenance requirements applicable to fire hazard mitigation of structures and premises regulated by the IWUIC. New construction requirements remain in Chapters 4, 5 and 6.

2. It relocates all existing requirements that are maintenance related from Chapter 6 into the appropriate sections of this new Chapter for clarity and easier use of this code.

3. It adds reasonable new requirements for maintenance or repair or replacement of features that were identified by F-CAC as gaps that needed to be addressed.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 for new construction. This proposal does not impose any new or additional cost to initial construction. However, there are new requirements for the maintenance and/or repair of wildfire mitigation measures that are already required for new construction. Maintenance and repair costs are variable and specific cost estimates could vary significantly over the lifespan of a building or property.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will impose additional costs related to ongoing maintenance, repair or replacement of features that were required for initial construction and site approval but do not increase the cost of initial construction.

Estimated Life Cycle Cost Impact:

Maintenance and repair costs are variable and specific cost estimates could vary significantly over the lifespan of a building or property. Costs may necessitate purchase of replacement materials, labor (which could by DIY) and increase as time goes by.

WUIC70-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: It was noted by the committee that it is not the intent of the existing conditions requirements in Section 102.8 for all existing properties to comply with the proposed new conditions, whether they were subject to this code or not when they were originally built. There are a few other sections like ground cover that could be better aligned with the other requirements that have already been approved in other proposals. (Vote: 10-3)

WUIC70-24

Individual Consideration Agenda

Comment 1:

IWUIC: [A] 102.8, CHAPTER 7, SECTION 701, 701.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

[A] 102.8 Existing conditions. The legal occupancy or use of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically provided for in this code, the International Fire Code or the *International Property Maintenance Code*, or as is deemed necessary by the *code official* for the general safety and welfare of the occupants and the public. ~~Existing properties shall comply with the defensible space requirements in Section 603 and Chapter 7.~~

CHAPTER 7
MAINTENANCE REQUIREMENTS

SECTION 701

GENERAL

701.1 Scope. Where a building or structure was constructed in accordance with this code or was previously *approved*, maintenance of ~~new and existing~~ buildings, structures, systems and premises in accordance with this code shall comply with this chapter. The construction requirements of this chapter are not intended to apply retroactively.

Reason: At the request of the committee, two modifications to the original proposal were made to make it more clear that these are maintenance provisions for buildings already constructed under this code. The remainder of the proposal does not change from the original.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal merely relocates all existing maintenance language. There are no core changes to any provision, and therefore no cost impact.

Comment (CAH2)# 320

WUIC71-24

IWUIC: APPENDIX C, SECTION C101, C101.1, TABLE C101.1, SECTION C101 (New),

C101.1
(New), C101.2 (New), C101.3 (New), C101.4 (New), C101.5 (New), C101.6 (New), C101.7 (New), C101.8 (New), TABLE C101.1 (New)

Proposed Change as Submitted

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

APPENDIX C
~~FIRE HAZARD SEVERITY FORM~~ COMMUNITY WILDLAND-URBAN INTERFACE (WUI) FIRE HAZARD EVALUATION FRAMEWORK

SECTION ~~C101~~
~~FIRE HAZARD SEVERITY FORM~~

~~**C101.1 Fire hazard severity form.** Where adopted, Table C101.1 is permitted to be used as an alternative to Table 502.1 for analyzing the fire hazard severity of building sites.~~

~~**TABLE C101.1 FIRE HAZARD SEVERITY FORM**~~

~~**A. Subdivision Design Points**~~	
~~1. Ingress/Egress~~	
~~Two or more primary roads~~	~~1~~ ___
~~One road~~	~~3~~ ___
~~One-way road in, one-way road out~~	~~5~~ ___
~~2. Width of Primary Road~~	
~~20 feet (6096 mm) or more~~	~~1~~ ___
~~Less than 20 feet (6096 mm)~~	~~3~~ ___
~~3. Accessibility~~	
~~Road grade 5% or less~~	~~1~~ ___
~~Road grade more than 5%~~	~~3~~ ___
~~4. Secondary Road Terminus~~	
~~Loop roads, cul-de-sacs with an outside turning radius of 45 feet (13 716 mm) or greater~~	~~1~~ ___
~~Cul-de-sac turnaround~~	~~2~~ ___
~~Dead-end roads 200 feet (60 960 mm) or less in length~~	~~3~~ ___

~~Dead-end roads greater than 200 feet (60 960 mm) in length~~ ~~5~~

~~5. Street Signs~~

~~Present~~ ~~1~~

~~Not present~~ ~~3~~

~~B. Vegetation (IWUIC Definitions)~~

~~1. Fuel Types~~

~~Light~~ ~~1~~

~~Medium~~ ~~5~~

~~Heavy~~ ~~10~~

~~2. Defensible Space~~

~~70% or more of site~~ ~~1~~

~~30% or more, but less than 70% of site~~ ~~10~~

~~Less than 30% of site~~ ~~20~~

~~C. Topography~~

~~8% or less~~ ~~1~~

~~More than 8%, but less than 20%~~ ~~4~~

~~20% or more, but less than 30%~~ ~~7~~

~~30% or more~~ ~~10~~

~~D. Roofing Material~~

~~Class A Fire Rated~~ ~~1~~

~~Class B Fire Rated~~ ~~5~~

~~Class C Fire Rated~~ ~~10~~

~~Nonrated~~ ~~20~~

~~E. Fire Protection—Water Source~~

~~500 GPM (1892.5 L/min) hydrant within 1,000 feet (304.8 m)~~ ~~1~~

~~Hydrant farther than 1,000 feet (304.8 m) or draft site~~ ~~2~~

~~Water source 20 min. or less, round trip~~ ~~5~~

~~Water source farther than 20 min., and 45 min. or less, round trip~~ ~~7~~

~~Water source farther than 45 min., round trip~~ ~~10~~

~~F. Existing Building Construction Materials~~

~~Noncombustible siding/deck~~ ~~1~~

~~Noncombustible siding/combustible deck~~ ~~5~~

~~Combustible siding and deck~~ ~~10~~

~~G. Utilities (gas and/or electric)~~

~~All underground utilities~~	~~1~~
~~One underground, one above ground~~	~~3~~
~~All above ground~~	~~5~~

~~Total for Subdivision~~

~~Moderate Hazard~~	~~40–59~~
~~High Hazard~~	~~60–74~~
~~Extreme Hazard~~	~~75+~~

Add new text as follows:

SECTION C101
COMMUNITY WUI FIRE HAZARD EVALUATION FRAMEWORK

C101.1

Definitions. The Community WUI Hazard Evaluation Framework presented here is intended for communities as small as a few hundred to tens of thousands of residents. The methodology is not intended for the documentation of single residences or large cities. It is intended to provide a community with an overview of the overall WUI fire-related hazards and to enable the code official to compare the relative hazards and preparedness levels of different communities. The information collected can be used by first responders and community and county officials to prioritize hazard mitigation within and around the community and to develop "tabletop" responses to different WUI fire scenarios. In the event of an actual WUI fire, the information collected could be used by first responders and local officials to safely evacuate civilians, to reduce the risk of first responder injuries and to enhance fire containment. The following are definitions and uses of the different components of Table C101.1 Community WUI Fire Hazard Evaluation Framework. This framework may be expanded to include additional characteristics that are not specifically listed in this preliminary version.

C101.2 Community. In the sense of WUI fire hazard, the community should be viewed in the context of evacuation arteries rather than jurisdictional boundaries. As such, the community may have parts that are incorporated or unincorporated. Community size is reported in acres, and the community boundary selected for this hazard evaluation can be provided for use in a geographic information system (GIS) layer in a number of formats, including but not limited to shapefile, geodatabase or Geo-Package. A topographic overview of the area (community) is used to describe the general conditions using one or more of the following key words: flat terrain, rolling hills, moderate slopes, valleys, steep slopes and/or plateau.

Information about prevailing weather patterns, such as localized winds or significant wind events (strength and direction), should also be included in the community profile.

C101.3 Fuels. The fuels section is intended to provide an overview of the structural, vegetative and other fuels present in the community. This is not a parcel-level assessment; however, if defensible space assessment data is available, it can be aggregated and utilized within this framework to provide higher resolution assessment of community fire hazard. Structure density is a simple metric to capture structure-to-structure spacing and provide insight on the potential structure-to-structure fire spread. For uniform communities, a representative structure separation distance (SSD) may be sufficient, whereas nonuniform communities will be better described using a histogram of SSD. The age of structures may also be a factor in structure vulnerability due to changes in building codes associated with structure hardening. Similarly, a community that was built over a short period of time can be represented by a single value representing the decade of construction, while a community that grew and expanded over long periods will be better represented by a histogram of structure ages.

A database such as LANDFIRE (www.landfire.gov/) can provide the vegetative fuel type and fuel loading throughout the community. This data will be limited by the age of the last LANDFIRE overflight and the 100 feet (30 meters) pixel spatial resolution.

Natural and artificial fuel breaks, including fuel treatments within and around the community, should be represented in a geospatial format and should include the year the vegetative fuel treatment was conducted. Fuel treatments should also include any logging activities in the area surrounding the community. Fire history in and around the community will describe the last time the community

experienced direct impacts from fire. Shapefiles of the fuel treatments and fire history will allow for spatial documentation of this data. Fuel treatments and fire history should be documented at least 10 miles (16 km) out from the edge of the community. Local conditions (e.g., fuel, topography, weather, evacuation routes) may require documentation well beyond 10 miles (16 km). The last large fire in the area of the community perimeter, together with the vegetative fuel loading, will provide information on the potential energy content of the vegetative fuels in the event of a short- or long-term drought.

The documentation of other community hazards, such as hazmat or high fuel load facilities (e.g., fixed propane tanks, hazardous material storage and use facilities, ammunition facilities lumber yards, pallet storage, tire storage), is important as they can affect civilians and first responder safety during evacuations, fire containment and mop-up activities. The information should be provided in the form of a GIS layer and may then be used by first responders to develop "tabletop" responses for emergency preparedness, and to direct response actions during a WUI fire event.

C101.4 Population. The population of the selected community will impact, among other factors, the minimum time required for evacuation. Population and population density, expressed as the number of residents per acre, are both important metrics that provide information that can be used for evacuation assessment. The permanent to transient population density ratio is intended to capture the fraction of the community that may be visiting for tourism and may not be aware of community evacuation and other fire related activities.

C101.5 Notification. The notification section of the Community WUI Hazard Evaluation is designed to capture the presence and type of mass-notification tools available to emergency managers. It should be noted that reliance on individual notification methods may result in limited notifications. If a Reverse 911 system is in place, the percentage of the community that will potentially receive the notifications from this system will estimate the number of residents that may require different notifications. Sirens or other fixed notification systems with power backup should also be listed in this section along with the fraction of the population covered by these systems. Additional notification systems that don't require phone or internet are also captured in this section, since WUI events frequently result in power outages or other service interruptions.

C101.6 Evacuation. This section of the Community WUI Hazard Evaluation is not intended to replace a full community evacuation study or act as a community evacuation plan. The primary purpose of this section is to compute, given a number of assumptions, a Minimum Throughput Time (MTT), to provide an initial idealized order of magnitude time to be considered in the early stages of evacuation pre-planning. This information can be of value to first responders and community emergency planning personnel, as it may potentially highlight critical evacuation bottlenecks inside or outside the community.

The MTT concept is a traffic engineering calculation of roadway capacity to provide an initial lower bound for planning community evacuation. The MTT is intended for isolated and partly isolated interface and intermix communities rather than a city setting with large populations and complex evacuation routes. A community should consider a detailed evacuation study to further enhance the community evacuation plan. There is a significant body of work associated with developing dynamic evacuation models. An example of a framework which includes coupled fire and evacuation considerations, as well as background on the individual model components, was published in 2019 in Safety Science, Volume 118, authored by Ronchi et al., titled "An open multi-physics framework for modelling WUI fire evacuations," on pages 868-880.

The MTT considers two significant factors: bottlenecks within and beyond town, and the total number of vehicles that must be accommodated. Bottlenecks slowing traffic throughput may be located within or outside of jurisdictional boundaries. Bottlenecks occurring well beyond the evacuating community may cause ripple effects significantly impacting community evacuation. In identifying the population for computing the MTT, consideration should be given to neighboring settlements/communities that may share the same evacuation route(s). The MTT should consider the minimum number of traffic lanes (i.e., 8 lanes merging into 2 lanes should be treated as 2 lanes) available for evacuation, the community population and the average speed limit of the egress routes. Contraflow, the implementation of reverse direction traffic flow, may be considered here, along with provisions for first responder access to the community. The computed Minimum Throughput Time (MTT) does not account for any of the numerous potential hindrances to evacuation traffic, such as road accidents, reduced speed due to smoke obscuration, merging of traffic in town to feed the primary arteries, large vehicles that occupy more space than cars and have reduced maneuverability, or fire activity impacts, such as burn overs, causing evacuation lane(s) closures and potential slowdowns associated with traffic redirections.

The evacuation section is also used to identify vulnerabilities of egress arteries including vegetative fuel setbacks as well as any hazardous material facilities which might affect evacuation. Fuel setback information, collected in 0.15 miles (0.25 km) increments along egress routes, presented in the form of a histogram and a GIS layer, could help identify vulnerable spots that may potentially impact evacuation and identify candidate locations for fuel treatments.

The presence of a Community Evacuation Plan, the presence and capacity of safety zones and other large crowd assembly areas, and

whether evacuation drills are performed will contribute to the community evacuation preparedness overview. The number of hospitals and senior care facilities and their total capacity will provide further information to assess overall community evacuation needs.

C101.7 Infrastructure / COOP / COG. The locations and needs of key facilities for maintaining continuity of operations (COOP) and continuity of government (COG), such as police, fire, EMS, hospitals, government buildings, cell towers, water sources, water provider infrastructure, electrical utility key infrastructure and natural gas key infrastructure should be listed and incorporated in this part of the evaluation framework.

Infrastructure characteristics, particularly related to water supply and electric utilities, can impact response and potential pre-fire hazard reduction. The public water system dependence on power supply, including the availability of backup power sources (i.e., generator backup) will provide insight into the resilience of the water system. The location of power lines (i.e., above or below ground) can impact evacuation, as downed power lines can impact evacuation and mobility throughout the community.

C101.8 Fire Fighting Response. The type of fire department, whether volunteer, career, or combined, may impact the likely availability and response time of first responder resources. The density of firefighting (ff) responders, as a ratio of the number of personnel on shift to the number of structures (number of ffs/number of structures) will provide information on the maximum possible coverage by the local resources.

In this section, mutual aid resources should be counted only if mutual aid agreements are in place and can ensure rapid deployment. Mutual aid response is captured through a histogram in 1-, 2-, 3- and 4-hour travel times. This may also be approximated using a geographic radius of distance from the community. The purpose of this information is to provide insight into the minimum response times by mutual aid.

TABLE C101.1 COMMUNITY WUI FIRE HAZARD EVALUATION FRAMEWORK

COMMUNITY	DATA TYPE	DATA LAYER IN MDS
Community shapefile, geodatabase or Geo-Package including topography and geographic attributes, and prevailing weather patterns (e.g., wind)	GIS layer	X
FUELS		
Structure Density (structure separation distances—SSD)	SSD histogram	
Age of structures	Histogram	
Vegetative fuel loading	Fuel type	
Fuel type	Tons/acre	
Fuel loading		
Natural and artificial fuel breaks	List, GIS layer	X
(including fuel treatments withina dn around community and year built)		
Community hazards (e.g., hazmat and high fuel load facilities)	Specify, GIS layer	X
Fire History	Frequency of, and most recent, fires in/around community	X
POPULATION		
Population	Number, age distribution	
Density	Number/acre	
Permanent/transient ratio	P/T ratio	
NOTIFICATION		
Reverse 911	Opt-in/Opt-out	
Opt-in or Opt-out	Percentage	
Percent of population enrolled in Reverse 911		
Sirens or other notification with power backup	List	
Percent of populatin within siren coverage range	Percent of population	
Notification dissemination without phone or internet	Y/N	
EVACUATION		
Egress Route Capacity (Minimum Throughput Time)	Time (hours)	

Vulnerability of egress arteries:	Fuel setback data, GIS layer,	X	
Fuel setback	Specify, GIS layer	X	
Hazmat/highfuel load factilities affecting evacuation		X	
Other			
Hospitals and senior care facilities	Specify, number of persons		X
Community evacuation plan	Y/N, specify, GIS layer	X	
Safety zones and large crowd assembly areas, capacity	Y/N, specify, GIS layer	X	
Evacuation drills	Y/N, specify, GIS layer	X	
Community in evacuation route of other communities, through-flow number	Y/N, identify, number		
INFRASTRUCTURE / COOP / COG			
Location and needs of key facilities	List		X
Public water	Y/N		
Dependence on power	Y/N		
Generator backup	Y/N		
Community owned water	Y/N		
Power lines around primary arteries (above ground or below)	Above or Below		X
Critical infrastructure that requires fuel to keep operating	Specify, GIS layer		X
FIRE FIGHTING RESPONSE			
Volunteer vs Career	Volunteer / career / combination		
(availability of first responder resources at station)			
Density of firefighting (FF) responder to number of structures (FF/structure ratio)	FF/structure		
Mutual aid response (engines-hours histogram) and agreements with mutual aid	Engines-hours histogram		

Reason: The proposed appendix in the Wildland Urban Interface Code is meant to be a tool to enable communities to collect, assemble, and represent the associated risks within the Wildland Urban Interface (WUI) fire area.

Community level fire hazard data is not always readily available in a centralized location and not in a standard format. The proposed framework enables communities' leaders to collect their WUI fire hazard data in an immediately accessible format.

This framework allows the community WUI fire hazard area data to be an inclusive picture. Part of the data assembled in the framework layout will help first responders during an incident. This data may enhance situational awareness, facilitate ingress and egress routes, and increase structure survivability through targeted fire responder actions.

The framework allows decision makers the ability to access WUI fire hazard risks across multiple communities when implemented in this standardized method. For example, a comparison can be made between a community of 5,000 residents to a community with 20,000 residents. They will be able to compare their overall fire hazard as well as the relative fire hazard.

The information from the standardized framework may be used to assist with making design and prioritize resources at the community, county, and state level. These resources may include funding for fuel treatment around communities in designated very high fire hazard severity zones.

The proposed framework has the benefit of enabling communities, county and state to use a methodized approach to assess hazards, offer property solutions and inform first responders before and during incidents.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost impact will be varied. Much of the data is already available but may be in many different documents. Pulling the data together will range from zero to "X" amount for a new community starting from scratch. The intent is to be a standard approach for any size community.

WUIC71-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Concern that the framework outline in the proposal is a lot more sophisticated than is currently in the existing appendix and how it relates back to the severity and additionally how it is treated elsewhere in the code. Concern for states like New York that have a statewide mutually globalization plan and how that is calculated into this, especially the value of structural firefighting versus wildland firefighting abilities. (Vote: 12-1)

WUIC71-24

Individual Consideration Agenda

Comment 1:

Proponents: Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov) requests As Submitted

Reason: same as original proposal

Bibliography: same as original proposal

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 803

WUIC72-24

IWUIC: APPENDIX G, SECTION G101, G101.1, G101.2, G101.3, G101.3.1, G101.3.2, G101.3.3, G101.3.4, G101.3.5, G101.3.6, G101.4, APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), G101.2.1 (New), G101.3 (New), G101.3.1 (New)

Proposed Change as Submitted

Proponents: Cary Yballa, Central County Fire Department, Cal FPO (cyballa@ccfd.org); Crystal Sujeski, CAL FIRE/Office of the State Fire Marshal (crystal.sujeski@fire.ca.gov); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Wildland Urban Interface Code

Revise as follows:

~~APPENDIX G~~
~~SELF-DEFENSE MECHANISM~~

~~SECTION G101~~
~~GENERAL~~

~~**G101.1 Identification of the problem.** The *International Wildland-Urban Interface Code* establishes a set of minimum standards to reduce the loss of property from wildfire. The purpose of these standards is to prevent wildfire spreading from vegetation to a building. Frequently, proposals are made by property or landowners of buildings located in the wildland-urban interface to consider other options and alternatives instead of meeting these minimum standards. This appendix chapter provides discussion of some elements of the proposed self-defense mechanisms and their role in enhancing the protection of exposed structures.~~

~~**G101.2 Structural survivability.** Various stages of assault occur as a building is exposed to a wildland-urban fire. Ashes are cast in front of a fire out of a smoke or convection column, which can result in secondary ignitions. Heavier embers that have more body weight and may contain more heat to serve as sources of ignition follow. Finally, the actual intrusion of a flame front and the radiant heat flux can expose combustibles outside of a building and the exterior structure of a building to various levels of radiant heat. A study revealed that the actual exposure of a building to the flame front by the perimeter of the fire was usually less than 6 minutes. However, the exposure to the forms of other materials that can result in proliferation of other ignitions can vary, depending on wind, topography and fuel conditions. To enhance structural survivability, the self-defense mechanisms must, first, do everything possible to prevent the ignition of materials from objects that are cast in front of the fire and, second, they must withstand the assault of the fire on the structure to prevent flames from penetrating into the building and resulting in an interior fire. There are considerable problems in achieving both of these objectives using some of the proposed alternative forms of protection such as the lack of definitive standards for self-defense mechanisms on the exterior of buildings. Although fire service has done considerable research into the evaluation of technology, such as smoke detectors, fire alarms, and interior sprinkler systems, very limited amount of study has been done on exterior sprinkler systems.~~
~~All forms of fire protection are classified as either active or passive. Active fire protection is taking specific action to control the fire in some manner. Passive fire protection uses resistance to ignition or provides some form of warning that allows other action to be taken. These two classifications of self-defense mechanisms create different problems with regard to being accepted as alternatives for building construction. Furthermore, certain self-defense mechanisms must be built in during new construction, and others may only be capable of being added as a retrofit to existing structures. As a matter of public policy, most *code officials* are reluctant to accept passive fire protection as an equivalent to a construction requirement, but are also reluctant to accept active fire protection systems that require intervention by suppression personnel.~~
~~The unequal distribution of self-defense mechanisms within a specific neighborhood poses another problem. If an individual is granted a waiver or exemption on the basis of putting in a nonmandated self-defense mechanism, and the neighbors to either side choose not to do so, or are not given the same options, there is a potential operational problem.~~

~~**G101.3 Alternative concepts.** Sections G101.3.1 through G101.3.6 provide consideration of several alternative self-defense~~

mechanisms.

G101.3.1 Exterior sprinkler systems. Currently, there is no nationally accepted standard for the design and installation of exterior fire sprinkler systems. Interior sprinkler systems are regulated by nationally recognized standards that have specific requirements. However, exterior sprinkler systems lack such uniformity. What is generally proposed is a type of sprinkler system, placed on the roofs or eaves of a building, whose primary purpose is to wet down the roof. These types of systems can be activated either manually or automatically. However, the contemporary thought on exterior sprinkler systems is that if the roof classification is of sufficient fire resistance, exterior sprinklers are of little or no value. Another option and alternative with exterior sprinklers is to use them to improve the relative humidity and fuel moisture in the *defensible space*. In this case, the exterior sprinkler is not used to protect the structure as much as it attempts to alter the fuel situation. However, studies do not support the idea that merely spraying water into the air in the immediate vicinity of a rapidly advancing wildland-urban fire does much good. Clearly, irrigation systems that keep plants healthy and fire-resistive plants that resist convection and radiated heat can accomplish the same purpose.

G101.3.2 Alternative water supply systems for exposure protection. Pools and spas are often offered as an alternative water source for fire departments. These water sources must be reliable and able to be accessed to be of any use by fire protection forces. Accessibility means that the fire department must be able to withdraw the water without having to go through extraordinary measures such as knocking down fences or having to set up drafting situations. Designs have been created to put liquid- or gas-fueled pumps or gravity valves on pools and spas to allow fire departments to access these water systems. A key vulnerability to the use of these alternative water systems is loss of electrical power. When the reliability of a water system depends on external power sources, it cannot be relied upon by fire fighters to be available in a worst-case scenario.

G101.3.3 Class A foam systems. One technology is Class A foam devices. These are devices that allow a homeowner to literally coat the exterior of their house with a thick layer of foam that prevents the penetration of embers and radiant heat to the structure. Experiments in various wildland fire agencies advocate foaming houses in advance of fire and flame fronts. To be accepted by the *code official*, the Class A foam system should pass rigorous scrutiny with regard to the manner and needs in which it is activated, the ways and means in which it is properly maintained, and a ways and means to test the system for its operational readiness during hiatus between emergencies.

G101.3.4 Enhanced exterior fire protection. This alternative method would increase the degree of fire resistance on the exterior of a building. This is most often an alternative recommended as a retroactive application when individual properties cannot achieve adequate *defensible space* on the exterior of a building. Normally, fire resistance and building scenarios are concerned with containing a fire. Fire-resistance ratings within building design ensures resistance to a fire for the specified time to compartmentalize the building's interior.To improve fire resistance on the exterior of the structure, the primary emphasis is on preventing intrusion into the building. This means protection of apertures and openings that may or may not be required to have any degree of fire resistance by accepted building codes. The option that is available here is for individuals to provide coverage in the form of shutters or closures to these areas, which, along with maintenance of combustible-free perimeters, can often prevent intrusion.

There are obvious limitations to this alternative. First and foremost is the means of adequately evaluating the proposed fire resistance of any given assembly. Testing techniques to determine fire resistance for such objects as drywall and other forms of construction may not be applicable to exterior application. Nonetheless, *code officials* should determine the utility of a specific fire resistance proposal by extrapolating conservatively.

G101.3.5 Shelter in place. Developments in the wildland-urban interface may be designed to allow occupants to "Shelter in place." Use of this design alternative should include ignition-resistant construction, access, water supply, automatic sprinkler systems, provisions for and maintenance of *defensible space*, and a *Fire Protection Plan*.A *Fire Protection Plan* describes ways to minimize the fire problems created by a specific project or development. The purpose for the *Fire Protection Plan* is to reduce the burden and impact of the project or development on the community's fire protection delivery system. The plan may utilize components of land use, building construction, vegetation management and other design techniques and technologies. It should include specific mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation and climate of the proposed site. The plan shall be consistent with this code, and approved by the fire *code official*. The cost of preparation and review is to be borne by the project or development proponent.

G101.3.6 Building location. The location of a new building within lot lines should be considered as it relates to topography and fire

~~behavior. Buildings located in natural chimneys, such as narrow canyons and saddles, are especially fire prone because winds are funneled into these areas and eddies are created. Buildings located on narrow ridges without setbacks may be subjected to increased flame and convective heat exposure from a fire advancing from below. Stone or masonry walls can act as heat shields and deflect the flames. Swimming pools and rated or noncombustible decks and patios can be used to create a setback, decreasing the exposure to the structure. Attic and under floor vents, picture windows and sliding glass doors should not face possible corridors due to the increased risk of flame or ember penetration.~~

~~**G101.4 Conclusion.** The purpose of the *International Wildland-Urban Interface Code* is to establish minimum standards that prevent the loss of structures, even if fire department intervention is absent. To accept alternative self-defense mechanisms, the *code official* must carefully examine whether these devices will be in place at the time of an event and whether they will assist or actually complicate the defense of the structure by fire suppression forces if they are available.The best alternative to having a building comply with all of the provisions of this code is to remove sources of fuel. This is closely paralleled by excellent housekeeping between the vegetation and the structure. Alternative ways of achieving each of these goals can and should be considered after scrutiny by appropriately credentialed and qualified fire protection personnel.~~

Add new text as follows:

APPENDIX G
VOLUNTARY HOME-HARDENING RECOMMENDATIONS

SECTION G101
GENERAL

G101.1 Identification of the problem. The International Wildland-Urban Interface Code establishes a set of minimum standards to reduce the loss of property from wildfire. The purpose of these standards is to prevent wildfire from spreading from vegetation to a building. Many homes were built in the wildland-urban interface areas prior to the implementation of provisions found in this code. As a result, many homes are lacking in their ability to survive an approaching wildfire. Many of the features discussed herein are designed as low-cost features to retrofit existing homes. Additionally, many owners desire to increase the survivability of their home and provide additional protection beyond the minimums prescribed in this code. This appendix chapter provides discussion of some elements of possible features to enhance survivability and harden the structure against an approaching wildfire.

G101.2 Structural survivability. The home hardening features listed in Section G101.21 were developed as a best practices guide to assist homeowners to increase the ignition-resistance of their homes from wildfires. Some of these items are based on upgrading to more stringent building materials when that building component is due for replacement as part of its normal maintenance or lifespan, such as the roof covering.

G101.2.1 Home hardening features. If homes are not already provided with the suggested protection, the following items should be considered in hardening a home against wildfire:

1. When it is time to replace your roof, replace it with a Class A fire rated roof.

2. Block any spaces between your roof covering and sheathing with noncombustible materials (bird stops).

3. Install a noncombustible gutter cover on gutters to precent the accumulation of leaves and debris in the gutter.

4. Cover your chimney and stovepipe outlets with a noncombustible corrosion resistant metal mesh screen (spark arrestor), with 3/8-inch to 1/2-inch openings.

5. Install ember and flame-resistant vents.

6. Caulk and plug gaps greater than 1/8-inch around exposed rafters and blocking to prevent ember intrusion into the attic or other enclosed spaces.

7. Inspect exterior siding for dry rot, gaps, cracks, and warping. Caulk or plug gaps greater than 1/8-inch in siding and replace any damaged boards, including those with dry rot

8. Install weather-stripping to fill gaps greater than 1/8-inch between garage doors and door frames to prevent ember intrusion. The weather-stripping must be compliant with UL Standard 10C.

9. When it's time to replace your windows or skylights, replace them with multilayered glazed panels containing at least one tempered pane or dome.

10. When it's time to replace your siding or deck, use compliant noncombustible or ignition-resistant materials.

11. Cover openings to operable skylights with noncombustible metal mesh screen with openings in the screen not to exceed 1/8-inch.

12. Install a minimum 6-inch metal flashing, applied vertically on the exterior of the wall at the deck-to-wall intersection to protect the building siding material.

G101.3 Defensible space features. The maintenance and defensible space features listed in Section G101.31 were developed as a best practices guide to assist homeowners to increase the effectiveness of their defensible space and improve the effects of the home hardening features to increase the survivability of their homes from wildfires.

G101.3.1 Maintenance and defensible space. The following maintenance and operational procedures assist to limit the impact on a home from an approaching wildfire:

1. Regularly clean your roof, gutters, decks, and the base of walls to avoid the accumulation of fallen leaves, needles, and other flammable materials.

2. Ensure that all combustible materials are removed from underneath, on top of, or within five feet of a deck.

3. Remove vegetation or other combustible materials that are within five feet of windows and glass doors.

4. Replace wood mulch products within five feet of all structures with noncombustible products such as dirt, stone, or gravel.

5. Remove all dead or dying grass, plants, shrubs, trees, branches, leaves, weeds, and pine needles within 30 feet of all structures or to the property line.

6. Ensure exposed firewood is stored at least 30 feet away from structures or completely covered in a fire-resistant material that will not allow embers to penetrate. Additionally, make sure you have 10 feet of clearance around your wood piles.

7. Be sure to store combustible outdoor furnishings away from your home when not in use.

8. Remember to properly store retractable awnings and umbrellas when not in use so they do not collect leaves and embers.

Reason: Home hardening is the term used to describe vegetation management compliance and building materials used to resist the intrusion of flames or embers projected by a wildland fire. It can be applied to new construction or for retrofitting an older home. Home Hardening considers the relationship between your home and its exposure to nearby combustible features such as vegetation, vehicles, accessory buildings, or even miscellaneous structures like a fence.

Your roof is one of the most vulnerable areas of your home! Due to its large surface area, your roof is more susceptible to embers and flame.

How is a roof vulnerable?

- Combustible roof coverings such as a non-fire-retardant treated wood shake or shingle roof. California requires roof coverings and assemblies to be Class A-ratedExternal Link. Common Class A roof coverings include asphalt shingles, tile or cement shingles, or metal panels.
- Gaps or openings in your roof assembly that have degraded exposing unprotected roof components.
- Debris accumulation on your roof, especially when located next to vulnerable areas such as combustible wall intersections.

What to do about a roof

- Keep your roof clear of debris and vegetation.
- Fill in gaps between the roof covering and the sheathing to prevent the intrusion of embers and flame.
- When it is time to replace your roof, install a Class A-rated roof covering such as asphalt fiberglass composition shingles.
- Replace combustible siding at roof-to-wall intersections with noncombustible siding.

How are roof attachments vulnerable?

- Debris accumulation around roof attachments.
- Gaps or penetrations in the roof covering from the installation of a roof attachment like a solar panel.

What to do about roof attachments

- Check periodically and keep areas around roof attachments free of debris.
- Ensure that roof attachments have enough space underneath them so that debris does not accumulate.
- Ensure openable skylights have a noncombustible metal mesh screen not exceeding 1/8 inch and have multipaned glazing with one layer of tempered glass.
- Install metal flashing around exposed wood frame skylights.

Check your gutters! Clean gutters regularly and install noncombustible gutter covers on gutters.

How are gutters vulnerable?

- Gutters without a gutter cover can allow accumulation of debris making it highly susceptible to embers and fire. If the debris catches on fire, it exposes unprotected combustible areas of your roof assembly.
- Gutters made of combustible materials such as vinyl can catch on fire and expose unprotected combustible areas of your roof assembly.

What to do about gutters

- At a minimum, install a noncombustible gutter cover to reduce the buildup of debris. When it is time to replace your gutters, replace them with a non-combustible option such as metal.
- Ensure your roof has a metal drip edge installed that completely covers the space above your gutter system.

Make sure your vents are protected from embers and fire. Upgrade your vents!

How are vents vulnerable?

- Access points such as your attic or crawlspace vents are areas embers or flames can enter and ignite combustible materials inside your home.
- Inlet vent that allows for the entry of wind-blown vegetative debris. Ridge or off-ridge vents located on your roof are more susceptible.
- Vents constructed of flammable materials such as plastic are highly vulnerable to embers and flames.

What to do about vents

- At a minimum, vents should have metal mesh screening that is at least 1/8 inch to protect against embers and flame.
- Upgrade to WUI-rated ember/flame-resistant vents. Be sure to accommodate for proper ventilation. Consult your local building official or licensed contractor for local building requirements for wildland areas.
- Keep debris away from all vents.
- Properly seal all openings including around blocking in vent areas.

Plug gaps or openings in your eaves and remove all vegetation and combustible materials that are directly underneath.

How are eaves vulnerable?

- Open eave construction with gaps or penetrations between the rafter tails and blocking as they are entry points for embers.
- Vents in eaves with gaps or penetrations in the blocking.
- Wide overhangs.
- Combustible fuel sources next to your home that can create a fire pathway for embers or flames to your eaves.

What to do about eaves

- Remove vegetation and combustible materials directly below eaves.
- Create a soffit eave (horizontal) or enclose eave (angled) using noncombustible material. Consult your local building official or licensed contractor for building codes in your area.
- Inspect eaves for gaps around rafter roof tails and blocking. Plug or caulk gaps.

Exterior siding that is combustible, has gaps, holes, or rot is vulnerable to both embers and flame.

How is siding vulnerable?

- If ignited, combustible siding can provide a path for flames to penetrate through other vulnerable areas such as windows, under-eave areas, or vents.
- Siding ignition from nearby combustibles that are too close to the house.
- Roof-to-wall areas where combustible siding is present.

- Gaps or penetrations in the exterior covering that are larger than 1/8 of an inch.

What to do about siding

- Plug or repair all gaps, holes, or rot in your exterior siding.
- Consider replacing combustible siding with a noncombustible or ignition-resistant material option. Consult your local building official or licensed contractor for local building codes in wildland areas.
- If a full replacement of your exterior covering is not possible then consider a partial replacement by using a noncombustible siding material for the bottom 2 feet from the ground and add metal flashing to protect the bottom edge sheathing.

Close the gap! Poorly sealed doors with gaps or penetrations provide a path for embers to enter your home or garage.

How are doors vulnerable?

- Doors that have rot or decay.
- Combustible door framing material as embers tend to accumulate at the bottom thresholds and sides.
- Doors that have gaps or penetrations greater than 1/8 inch.
- Door screens that are not made of metal mesh.
- Fuel sources stored nearby or inside a garage which increases its ignition potential.
- Garage doors that lack gasketing or have gaps that allow for the intrusion of embers.

What to do about doors

- Install or replace non-compliant wood screen or sliding doors with a noncombustible option.
- Install metal mesh screens in sliding or screen doors.
- Relocate combustibles and flammables inside your garage so they are not located next to ignition sources.
- Add metal flashing at garage door jambs and headers.
- Add gasketing (weather-striping) to garage doors to prevent ember intrusion.

Remove combustibles and vegetation around windows and upgrade older vulnerable single-pane windows with ones designed for areas that experience wildland fire.

How are windows vulnerable?

- Windows that are left open unattended.
- Combustible framing material that, when ignited, glass breaks or falls out providing a path for embers or flames to enter your home.
- Radiant heat which can cause windows to break even before fire reaches the house. Single-pane and large windows are particularly vulnerable.
- Windows that face large vegetation areas or have vegetation directly underneath.
- Vinyl windows that do not have an internal reinforcement bar in the horizontal or vertical separator member as they are prone to failure from radiant exposure due to deformation of the frame.

What to do about windows

- Install or upgrade to double-pane tempered glass windows. Tempered glass is about four times more resistant to breaking during a wildfire.
- Noncombustible metal framing material is an optimal choice.
- Confirm if vinyl windows have a vertical or horizontal reinforcement bar.
- Create a 0 to 5 ember-resistant zone by removing vegetation and other combustibles by all windows.
- Install metal mesh window screens to improve the performance of windows subjected to radiant heat exposure.

Protect your deck! Deck ignitions can start from flames underneath or embers on top.

How is a deck vulnerable?

- Combustible damaged or rotting deck boards as they are more easily ignitable.

- Deck boards made of combustible materials that are attached to the residence.
- Deck-to-wall intersections that have combustible siding and no metal flashing.
- Combustibles within the first 0 to 5 feet zone around a combustible deck (patio furniture, planter boxes, door mats, etc.)
- Combustible items stored underneath your deck that could be an ignition source for fire.
- Decks that overhang a slope that can be exposed to flames from trees or other vegetation downslope.
- Lattice or other combustible fencing options are used as a vertical enclosure under a deck, as it is readily ignitable.

What to do about decks

- Create an ember-resistant zone under the deck footprint extending five feet outward to reduce the likelihood of under-deck flame exposure. Use hardscapes like gravel, pavers, or concrete.
- Ensure sufficient defensible space if your deck is overhanging and located on a slope to minimize flame spread.
- Replace deck boards with ignition-resistant, noncombustible, fire-retardant-treated wood, or material that complies with performance testing standards (this includes steps, stairs, and railings).
- Replace any damaged or rotting deck boards as they ignite more easily.
- Install a minimum of a 6-inch metal flashing applied vertically on the exterior wall and at deck-to-wall intersections.
- If a full replacement of your deck is not possible then consider a partial replacement by replacing the walking surface boards with a noncombustible option for the first 1 ft. away from the residence.
- Remove combustible items stored under your deck.
- Regularly clear debris on top of or underneath your deck.

Bibliography: https://www.fire.ca.gov/home-hardening

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The section is voluntary. The cost is determined based on the recommendations to harden an existing structure in the Wildland Urban area.

WUIC72-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for the approval of the proposal were: It updates the appendix with new information and brings it up to current criteria. It is an information only existing appendix that is being updated with current terminology. It is an appropriate change regarding providing information and as an educational piece, it also allows ICC as a code organization to modify it as the code continues to be modified to make sure it aligns the two groups together. It has a lot of credibility because it's been vetted by organizations that have expertise and it correlates with the intent of the code. (Vote: 11-2)

WUIC72-24

Individual Consideration Agenda

Comment 1:

IWUIC: G101.2.1

Proponents: Aaron Phillips, Asphalt Roofing Manufacturers Association (ARMA), Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

G101.2.1 Home hardening features. If homes are not already provided with the suggested protection, the following items should be considered in hardening a home against wildfire:

1. When it is time to replace your roof, replace it with a *roof assembly* classified as Class A when tested in accordance with ASTM E108 or UL 790 ~~fire rated roof~~.
2. Block any spaces between your roof covering and sheathing with noncombustible materials (bird stops).
3. Install a noncombustible gutter cover on gutters to precent the accumulation of leaves and debris in the gutter.
4. Cover your chimney and stovepipe outlets with a noncombustible corrosion resistant metal mesh screen (spark arrestor), with 3/8-inch to 1/2-inch openings.
5. Install ember and flame-resistant vents.
6. Caulk and plug gaps greater than 1/8-inch around exposed rafters and blocking to prevent ember intrusion into the attic or other enclosed spaces.
7. Inspect exterior siding for dry rot, gaps, cracks, and warping. Caulk or plug gaps greater than 1/8-inch in siding and replace any damaged boards, including those with dry rot
8. Install weather-stripping to fill gaps greater than 1/8-inch between garage doors and door frames to prevent ember intrusion. The weather-stripping must be compliant with UL Standard 10C.
9. When it's time to replace your windows or skylights, replace them with multilayered glazed panels containing at least one tempered pane or dome.
10. When it's time to replace your siding or deck, use compliant noncombustible or ignition-resistant materials.
11. Cover openings to operable skylights with noncombustible metal mesh screen with openings in the screen not to exceed 1/8-inch.
12. Install a minimum 6-inch metal flashing, applied vertically on the exterior of the wall at the deck-to-wall intersection to protect the building siding material.

Reason: This comment coordinates language in section G102.2.1 with changes brought forward in WUIC33-24, which was recommended for approval as submitted during Committee Action Hearing #1. ASTM E108 and UL 790 tests are performed on *roof assemblies* to establish a classification (Class A, B, or C). In contrast, ASTM E119 or UL 263 tests evaluate the duration for which building elements contain a fire, retain their structural integrity, or exhibit both properties during a predetermined test exposure. The result of these tests is expressed as a *fire resistance rating.*

The current language in G101.2.1, item 1 implies that a fire resistance rated roof should be installed, when the intent is to recommend that the building owner install a roof assembly classified as Class A in accordance with ASTM E108 or UL 790.

Even though this is an informational section, there is benefit to clarification of the language for consistency with other sections of the

International Codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modification offered in this comment clarifies existing provisions. Therefore, no change in cost of construction is expected.

Comment (CAH2)# 22

F5-24

IFC: 105.5.36

Proposed Change as Submitted

Proponents: Scott Plumer, Arvada Fire Protection District, Arvada Fire Protection District

2024 International Fire Code

Revise as follows:

105.5.36 Open burning. An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be complied with.

Exception: *Recreational fires* and *portable outdoor fireplaces*.

Reason: This proposal adds an exception for *portable outdoor fireplaces* to the open burning requirements. There is no need to require permits for these appliances since the code already requires they be used according to the manufacturer instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not affect the cost of construction as it is a clarification only.

F5-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that the addition of “portable outdoor fireplaces” to the exception makes sense because it is contained and safer than open burning. (Vote: 14-0)

F5-24

Individual Consideration Agenda

Comment 1:

IFC: 105.5.36, SECTION 202, 307.1, 307.1.1, 307.2, 307.5

Proponents: Jeffrey Shapiro, P.E., FSFPE, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

105.5.36 Open burning. An operational permit is required for *open burning* ~~the kindling or maintaining of an open fire or a fire~~ on any ~~public street, alley, road, or other~~ public or private property~~ground~~. Instructions and stipulations of the permit shall be complied with.

~~**Exception:** *Recreational fires* and *portable outdoor fireplaces.*~~

BONFIRE. ~~An outdoor fire utilized~~ A type of o*pen burning*, conducted for ceremonial purposes.

OPEN BURNING. The kindling or burning of materials wherein products of combustion are emitted directly into the ambient air without passing through a stack or chimney from an enclosed chamber, other than ~~Open burning does not include~~ road flares, smudgepots and similar devices associated with safety or occupational uses~~ typically considered open flames~~, *recreational fires* ~~or use of~~ and fires in portable outdoor fireplaces. For the purpose of this definition, a chamber ~~shall be regarded as~~ is considered to be enclosed when, during the time combustion occurs, only apertures, ducts, stacks, flues or chimneys necessary to provide combustion air and permit the escape of exhaust gas are open.

307.1 General. ~~A person shall not kindle or maintain or authorize to be kindled or maintained any *open burning* unless conducted and *approved* in accordance~~ Open burning, *recreational fires* and portable outdoor fireplaces shall comply with Sections 307.1.1 through 307.5.

307.1.1 Prohibited open burning. *Open burning* shall be prohibited unless *approved* and shall not be conducted when atmospheric conditions or local circumstances make such fires hazardous.

Exception: Prescribed burning for the purpose of reducing the impact of wildland fire when authorized by the *fire code official*.

307.2 Permit required. A permit shall be obtained from the *fire code official* in accordance with Section 105.5 prior to conducting *open burning* for any purpose, including but not limited to ~~kindling a fire for~~ recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or a *bonfire*. Application for a permit~~such approval~~ shall only be presented by and permits shall only be issued to the *owner* of the land on which *open burning* will be conducted~~the fire is to be kindled~~.

307.5 Attendance. *Open burning*, including but not limited to *bonfires*~~bonfires,~~; *recreational fires;* and ~~use of~~ portable outdoor fireplaces that are in use shall be constantly attended until the fire is extinguished. ~~Not fewer than o~~One or more portable fire extinguishers complying with Section 906 with a minimum 4-A rating or other *approved* on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization.

Reason: The proposed addition of "portable outdoor fireplaces" in the exception brought to light a much larger issue in the code related to use and definition of the term "open burning." Open burning, as currently defined, does not include portable outdoor fireplaces, so adding this to the permit exception makes no sense. Likewise, recreational fires aren't included in the definition of open burning, so arguably the exception to the open burning permit in 105.5.36 made no sense in the current and previous editions of the code. Deleting the exception would be a simple fix, but because it exposes other inconsistencies associated with the defined open burning term, it makes sense to clean up sections that are associated with open burning permits. This proposal does not intend to make any technical changes in that regard. It simply fixes the mistake made by approving the original proposal and what appears to be other related provisions that led to confusion or misunderstanding.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Cleans up existing provisions with no intended technical changes.

Comment (CAH2)# 782

F7-24

IFC: SECTION 202; IBC: SECTION 202

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level 3.~~3, Level 2 or Level 1.

~~Level 3 aerosol products~~ Level 1. ~~Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

~~Level 1 aerosol products~~ Level 3. ~~Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g)..

~~Level 2 aerosol products~~ Level 2. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

2024 International Building Code

Revise as follows:

[F] AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level~~ 3, Level 2 or Level 1.

~~Level 3 aerosol products~~ Level 1. ~~Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

~~Level 1 aerosol products~~ Level 3. ~~Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).~~ An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

~~Level 2 aerosol products~~ Level 2. An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes:Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

Reason:
Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk

and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

For consistency with other Hazardous Materials classifications throughout the I-codes, this proposal re-orders the Aerosol products to list the highest hazard materials first (Level 3), followed in order by reduced level of hazard, ending with the least hazardous material (Level 1).

Aerosol definitions are similar between IFC and GHS, with the same cut-off values for heat of combustion. However, GHS definitions of aerosols include additional testing criteria including ignition distance tests and percentage of flammable components. Minimal changes are anticipated by using the proposed definitions.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F7-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved based upon technical problems with the classifications that need to be addressed. The GHS definition does not appropriately address heat of combustion which was the primary criteria for aerosols as addressed in NFPA 30B. If the GHS definition is used, there will also need to be additional information, guidance, and criteria to address this key criteria. (Vote 13-1)

F7-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 ~~aerosol products~~. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 3) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Level 2 ~~aerosol products~~. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 2) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Level 3 ~~aerosol products~~. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 1) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

2024 International Building Code

[F] AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 ~~aerosol products~~. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 3) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Level 2 ~~aerosol products~~. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 2) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Level 3 ~~aerosol products~~. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g) and, where the heat of combustion is unknown, those classified as Aerosols (Category 1) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Reason: This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Utilizing the GHS is likely to result in the proper identification of multiple hazards and the degree of hazard.

The original proposal was disapproved primarily because the GHS definition does not rely solely on the heat of combustion (HOC), which is the primary criterion used in NFPA 30B to address aerosols. The GHS also considers the percent of flammable constituents and, in some cases, ignition distance and flammability testing. The revision here maintains the current definition with the HOC as the primary criteria for classification, but also allows for the GHS classification when the HOC is unknown.If approved, this change is anticipated to encourage manufacturers to include the HOC in Section 9 (Physical and Chemical Properties) of the Safety Data Sheets they publish. This inclusion will make the HOC readily accessible to code users, thereby enhancing the information available to classify aerosols or verify assigned classifications correctly.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as

interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

Comment (CAH2)# 302

F13-24

IFC: SECTION 202; IBC: SECTION 202

Proposed Change as Submitted

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Fire Code

Revise as follows:

COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property in commerce where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or
2. Is designed to transport 16 or more passengers, including the driver.

2024 International Building Code

Revise as follows:

[F] COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property in commerce where the motor vehicle meets one of the following:

1. Has a gross vehicle weight rating of 10,000 pounds (4540 kg) or more.
2. Is designed to transport 16 or more passengers, including the driver.

Reason: The current definition in the IFC for “Commercial Motor Vehicle is from 49 CFR Part 390.5, Federal Motor Carrier Safety Regulations, however the scope of those regulations deals exclusively with commercial motor vehicles which transport property or passengers in interstate commerce. This code change to the ICC aligns the IFC more closely with that federal regulation and helps avoid the improper application of this definition to RVs or vehicles used for van pools.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00 Construction costs for RV and van pool storage buildings could decrease.

Estimated Immediate Cost Impact Justification (methodology and variables):

Facilities designed for the storage of RVs and van pool vehicles will have a 12,000 SF threshold per fire area as opposed to a 5,000 SF threshold per fire area before sprinklers are required.

Estimated Life Cycle Cost Impact:

n/a

Estimated Life Cycle Cost Impact Justification (methodology and variables):

n/a

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Limiting to vehicles in commerce does not reduce the fuel load that should still be regulated. This definition has much broader implications than RV and or van pool storage. (Vote 12-2)

F13-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or

2. Is designed to transport 16 or more passengers, including the driver.

Vehicles intended for private recreation shall not be considered commercial motor vehicles.

2024 International Building Code

Revise as follows:

[F] COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property where the motor vehicle meets one of the following:

1. Has a gross vehicle weight rating of 10,000 pounds (4540 kg) or more.

2. Is designed to transport 16 or more passengers, including the driver.

Vehicles intended for private recreation shall not be considered commercial motor vehicles.

Reason: The definition of "Commercial Motor Vehicle" currently encompasses personally-owned RVs in private and privately-rented garages. The Committee did not want to limit the definition of "commercial motor vehicle" to ones only used in commerce, but committee members were supportive of the idea of a more targeted proposal that does not include RVs. This revised wording does just that.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Garages designed for the storage of RVs will have a 12,000 SF threshold per fire area as opposed to a 5,000 SF threshold per fire area before sprinklers are required.

Estimated Immediate Cost Impact Justification (methodology and variables):

Savings of $36,000 - $285,000 for a 12,000 SF building assuming $3/SF for sprinklers and up to $250,000 if a fire pump and water tank would also bee required.

Comment (CAH2)# 559

F23-24

IFC: SECTION 202; IBC: SECTION 202

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com)

2024 International Fire Code

Revise as follows:

HIGHLY TOXIC. ~~A material which produces a lethal dose or lethal concentration which falls within any of the following categories:~~ A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist~~, fume~~ or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

TOXIC. ~~A chemical falling within any of the following categories:~~A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

2024 International Building Code

Revise as follows:

[F] HIGHLY TOXIC. ~~A material which produces a lethal dose or lethal concentration that falls within any of the following categories:~~
A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as *highly toxic*. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

[F] TOXIC. ~~A chemical falling within any of the following categories:~~
A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram, but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million, but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely

outcomes of utilizing the GHS.

The GHS and current IFC definitions for Highly toxic materials are the same (perfect alignment), except that “fumes” are not included in GHS terminology. The term “fume” is not defined in the IFC and is likely to be included in the measurements for vapors, dusts, and/or mists. The table below shows the alignment between current IFC Highly Toxic (dark blue shading) and GHS Categories. Definitions for Toxic materials align perfectly between current IFC and GHS definitions based on dermal exposure routes and for inhalation dusts and mists exposure routes. However, Toxic materials by oral, inhalation gases, and inhalation vapors routes of exposure have different cut-off values between current IFC and GHS definitions. For the sake of alignment with GHS, this proposal expands the current IFC Toxic definitions for these three routes of exposure. This Table demonstrates the alignment for each exposure route. Current IFC Toxic is shaded in medium blue. The proposed definition of Toxic (aligns with GHS) is expanded to include the area shaded in light blue. Unshaded (white) areas are not regulated.

IFC current	IFC proposal
Highly Toxic	Highly Toxic
Toxic	Toxic
	Toxic

		GHS			
Exposure Route	**Category 1**	**Category 2**	**Category 3**		**Category 4**	
Oral (LD50, mg/kg)	<5	5 - 50	50 - 300		300 - 500	500 - 2,000
Dermal (LD50, mg/kg)	<50	50-200	200-1,000		1,000 – 2,000	
Inhalation – Gases (LC50 ppm, 4 hr)	<100	100 - 500	500 - 1,000	1,000 – 2,500	2,500 - 20,000	
Inhalation – Vapors (LC50 mg/L, 4 hr)*	<0.5	0.5 - 2	2 - 4	4 - 10	10 - 20	
Inhalation – Dusts and Mists (LC50 mg/L, 4 hr)	<0.05	0.05 - 0.5	0.5 - 1		1 - 5	

Inhalation values in the above table use 4-hr exposure values. IFC values have been converted from 1-hr to 4-hr exposures per GHS Section 3.1.2.6.1: divide by 2 for gases and vapors, divide by 4 for dusts and mists. *Because ppm is a mass-to-mass or volume-to-volume ratio and mg/l is a mass-to-volume ratio, the following conversion was used for vapors: To convert from units of mg/L to ppm, use the following equation. Endpoint (ppm) = [Endpoint (mg/L) x 1000 x 24.5] / [Molecular Weight] Source: https://www.epa.gov/rmp/toxic-endpoints-are-milligrams-liter-mg-l-equivalent-parts-million-ppm

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System (GHS) of Classification and Labelling of Chemicals

which is used globally and by OSHA. This revised definition will make compliance more straightforward. In some cases, this revised definition may more heavily regulate additional materials for new buildings as the revised definition widens what is considered Toxic. However, this is balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F23-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The table provided is useful in explaining the alignment or lack thereof with GHS Categories. Highly toxic materials align well but toxic materials do not. This will potentially increase the cost of construction as more buildings will need to be classified as Group H-4 without proper justification. The cost impact statement does not reflect these impacts. More technical data is needed to identify where the requirements are going to change based on a broader toxic designation. Potentially an analysis is needed to understand the significance of the hazard or the risk associated with the materials. The MAQ tables will need evaluation and revision potentially. (Vote 13-1)

F23-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant, self (lynne.kilpatrick@hmexassistant.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

HIGHLY TOXIC. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as any one of the following GHS Acute Toxicity categories: ~~Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2.~~

	Oral Category 1 or 2·
	Dermal Category 1 or 2·
	Inhalation Gases Category 1
	Inhalation Vapors Category 1·
	Inhalation Dusts and Mists Category 1 or 2.

Where the GHS category is not known, ~~one of the following is acceptable~~ use the following for classification purposes:

1.	A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2.	A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3.	A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.div widget

TOXIC. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as any one of the following GHS Acute Toxicity categories: ~~Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4.~~

	Oral Category 3
	Dermal Category 3
	Inhalation Gases Category 2
	Inhalation Gases Category 3 and having an LC50 ≤1,000 ppm (4 hour exposure)
	Inhalation Vapors Category 2
	Inhalation Vapors Category 3 and having an LC50 ≤4 mg/l (4 hour exposure)
	Inhalation Dusts and Mists Category 3 or 4

Where the GHS category is not known, ~~one of the following is acceptable~~ use the following for classification purposes:

1.	A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than ~~500~~300 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2.	A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3.	A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

2024 International Building Code

Revise as follows:

[F] HIGHLY TOXIC. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as any one of the GHS Acute Toxicity categories:
~~Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2.~~

	Oral Category 1 or 2
	Dermal Category 1 or 2
	Inhalation Gases Category 1
	Inhalation Vapors Category 1
	Inhalation Dusts and Mists Category 1 or 2

Where the GHS category is not known, ~~one of the following is acceptable~~ use the following for classification purposes:

1.	A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2.	A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3.	A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as *highly toxic*. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

[F] TOXIC. A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as <u>any one of the following GHS Acute Toxicity categories:</u>
~~Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4.~~

	<u>Oral Category 3</u>
	<u>Dermal Category 3</u>
	<u>Inhalation Gases Category 2</u>
	<u>Inhalation Gases Category 3 and having an LC50 ≤1,000 ppm (4 hour exposure)</u>
	<u>Inhalation Vapors Category 2</u>
	<u>Inhalation Vapors Category 3 and having an LC50 ≤4 mg/l (4 hour exposure)</u>
	<u>Inhalation Dusts and Mists Category 3 or 4</u>

Where the GHS category is not known, ~~one of the following is acceptable~~ <u>use the following</u> for classification purposes:

1.	A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than ~~500~~<u>300</u> milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2.	A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram, but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3.	A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million, but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Reason: This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

The original proposal was disapproved, based upon concerns that the new TOXIC definition expands the scope of what is currently regulated by the IFC. The proposed changes are consistent with aligning GHS with current IFC cut-offs for toxic materials for all routes of exposure except via the oral route. For dermal and inhalation routes of exposure, this would not change the scope of what is currently regulated as toxic material. For the oral route of exposure, a less conservative approach was used that results in only regulating materials with LD50 values at or below 300 mg/kg (as opposed to 500 mg/kg). While this reduces the current range for oral toxicity, exposure to first responders via the oral route is the least likely form of exposure to chemicals.

This proposed definition requires validation of LD50 and LC50 values for 2 routes of exposure: gases, and vapors. For example, if a material is classified as GHS Category 4 (Gases), the user will need to verify that the LC50 is less than or equal to 1,000 ppm.

Table showing alignment of current (IFC) vs. proposed changes

IFC currently regulated	IFC-CAH2 proposal
Highly Toxic	Highly Toxic

Toxic	Toxic
Toxic	~~Toxic~~ (not regulated)
Not regulated	Not regulated

Comparison table (IFC vs. GHS proposed) for all routes of exposure

		GHS			
Exposure Route	**Category 1**	**Category 2**	**Category 3**	**Category 4**	
Oral (LD50, mg/kg)	<5	5 50	50 - 300	~~300 500~~	500 - 2,000
Dermal (LD50, mg/kg)	<50	50 200	200-1,000	1,000 – 2,000	
Inhalation – Gases (LC50 ppm, 4 hr)	<100	100 - 500	500 - 1,000	1,000 – 2,500	2,500 - 20,000
Inhalation – Vapors (LC50 mg/L, 4 hr)*	<0.5	0.5 - 2	2 - 4	4 - 10	10 - 20
Inhalation – Dusts and Mists (LC50 mg/L, 4 hr)	<0.05	0.05 0.5	0.5 - 1	1 - 5	

Inhalation values in the above table use 4-hr exposure values. IFC values have been converted from 1-hr to 4-hr exposures per GHS Section 3.1.2.6.1: divide by 2 for gases and vapors, divide by 4 for dusts and mists. *Because ppm is a mass-to-mass or volume-to-volume ratio and mg/l is a mass-to-volume ratio, the following conversion was used for vapors: To convert from units of mg/L to ppm, use the following equation. Endpoint (ppm) = [Endpoint (mg/L) x 1000 x 24.5] / [Molecular Weight] Source: https://www.epa.gov/rmp/toxic-endpoints-are-milligrams-liter-mg-l-equivalent-parts-million-ppm

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This comparison will make compliance more straightforward. In some cases, utilizing GHS definitions may more heavily regulate additional materials for new buildings; conversely, in other cases GHS definitions will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F24-24

IFC: SECTION 202; IBC: SECTION 202

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

INERT COMPRESSED GAS. A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or *health hazard* properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.

2024 International Building Code

Revise as follows:

[F] INERT COMPRESSED GAS. A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.

Reason: This modification is a clarification and is intended to distinguish inert compressed gases, which may be gaseous or liquefied, from inert cryogenic fluids. It aligns with the revised definition of Compressed Gas submitted under a separate proposal.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide clarification and correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition will not affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F24-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal is not in alignment to have this term used throughout the body of the code. There was concern that term compressed needs to be addressed in the definition (Vote 8-5)

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Lynne Kilpatrick, HMEx Assistant, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

INERT GAS. A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or *health hazard* properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. ~~Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.~~

2024 International Building Code

[F] INERT GAS. A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a *compressed gas*. ~~Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.~~

Reason: The original proposal was disapproved based on concerns that it did not align with how the term Inert Gas is used throughout the body of the code. The original proposal intended to distinguish between inert compressed gases and inert cryogenic fluids, given that a new sub-definition for Inert Cryogenic Fluid was proposed in F16-24 and Approved as Submitted by the Committee.This proposal retains the current definition to address the Committee's concern, but deletes the list of example gases which typically are not included in defintions.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change eliminates an example list of chemicals included in a definition and will not impact construction costs.

Comment (CAH2)# 305

F26-24

IFC: SECTION 202; IBC: SECTION 202

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lynne.kilpatrick@hmexassistant.com); Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu)

2024 International Fire Code

Revise as follows:

ORGANIC PEROXIDE. Liquid or solid ~~An~~ organic ~~compound~~ substances that contain~~s~~ the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides ~~can present an explosion hazard (*detonation* or *deflagration*) or they can be shock sensitive~~ are thermally unstable substances or mixtures, which can undergo exothermic self-accelerating decomposition. In addition, they can have one or more of the following properties:

1. Be liable to explosive decomposition;
2. Burn rapidly;
3. Be sensitive to impact or friction;
4. React dangerously with other substances;
5. ~~They can also decompose~~ Decompose into various unstable compounds over an extended period of time.

Class I. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.
Class II. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.
Class III.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes:

~~Describes t~~T

hose formulations that burn rapidly and that pose a moderate reactivity hazard.
Class IV. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.
Class V. Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.
Unclassified detonable.

Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes:

Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

2024 International Building Code

Revise as follows:

[F] ORGANIC PEROXIDE. Liquid or solid ~~An~~ organic ~~compound~~ substances that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides ~~can pose an *explosion* hazard (*detonation* or *deflagration*) or they can be shock sensitive~~ are thermally unstable substances or mixtures, which can undergo exothermic self-accelerating decomposition. In addition, they can have one or more of the following properties:

1. Be liable to explosive decomposition;
2. Burn rapidly;
3. Be sensitive to impact or friction;
4. React dangerously with other substances;
5. ~~They can also decompose~~ Decompose into various unstable compounds over an extended period of time.

Class I.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.
Class II.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.
Class III.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes:

~~Describes t~~T

hose formulations that burn rapidly and that pose a moderate reactivity hazard.
Class IV.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.
Class V.
Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes:
~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.
Unclassified detonable.

Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes:

Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

Reason: Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners and is an ongoing challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS. The current definition for Organic Peroxide in the IFC is subjective and is not based on a defined test method or standardized set of criteria. Under the GHS, Organic Peroxide types are assigned based on the physical state, a determination of the formulations control and emergency temperature if applicable, and its performance under the testing protocol specified in the UN Manual of Tests and Criteria for Organic Peroxides. The GHS types and definitions proposed here are comparable to the generic transport types defined by the US Department of Transportation and reflect the relative hazard when packaged for transportation. This proposal aligns six DOT and GHS transport types with the five existing sub-categories of IFC Organic Peroxides. In that regard, transport Types C and D are proposed to be classified as Class II Organic Peroxides since both Types can present a moderate reactivity hazard.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This revised definition is not likely to affect the application of the code and will make compliance more straightforward. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F26-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The use of the GHS criteria enhances and aligns with the IFC definition. (Vote 14-0)

F26-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

ORGANIC PEROXIDE. ~~An~~ Liquid or solid organic ~~compound~~ substances that contain~~s~~ the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time. Organic peroxide classifications used in the International Codes are based on the organic peroxide transport type determined in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and the burning rate of the material.

Class I. Describes those formulations that are capable of *deflagration* but not *detonation*. This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type B under GHS regardless of the burning rate.
2. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 300 kg/min.
3. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 9.0 kg/(min × m^2) unless the large-scale burning rate is less than 300 kg/min.
4. Organic peroxides of Type C, D, E, or F under GHS where the burning rate is not known

Class IIA. Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.
This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 140 kg/min, but less than 300 kg/min.
2. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m^2), but less than 9.0 kg/(min × m^2).
3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 140 kg/min.
4. Organic peroxide Type E under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m^2).

Class IIB.
Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type C under GHS with a large-scale burning rate less than 140 kg/min.
2. Organic peroxide Type C under GHS with a small-scale burning rate less than 2.2 kg/(min × m^2).
3. Organic peroxide Type D or E under GHS with a large-scale burning rate equal to or greater than 60 kg/min, but less than 140 kg/min.
4. Organic peroxide Type D or E under GHS with a small-scale burning rate equal to or greater than 0.9 kg/(min × m^2), but less than 2.2 kg/(min × m^2).

Class III. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.
This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type D under GHS with a large-scale burning rate less than 60 kg/min.
2. Organic peroxide Type D under GHS with a small-scale burning rate less than 0.9 kg/(min × m²).
3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 10 kg/min, but less than 60 kg/min.
4. Organic peroxide Type E under GHS with a small-scale burning rate less than 0.9 kg/(min × m²).
5. Organic peroxide Type F under GHS with a large-scale burning rate equal to or greater than 10 kg/min.
6. Organic peroxide Type F under GHS regardless of the small-scale burning rate.

Class IV. Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.
This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type E or F under GHS with a large-scale burning rate less than 10 kg/min.

Class V. Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type G under GHS.
~~**Unclassified detonable**~~**Detonable.** *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition. This class is comprised of organic peroxide formulations which are organic peroxide Type A under GHS.

2024 International Building Code

Revise as follows:

[F] ORGANIC PEROXIDE.
~~An~~ Liquid or solid organic ~~compound~~ substances that contain~~s~~ the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radical~~s~~. The term also includes organic peroxide formulations (mixtures). Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time. Organic peroxide classifications used in the International Codes are based on the organic peroxide transport type determined in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and the burning rate of the material.

Class I. Those formulations that are capable of *deflagration* but not *detonation*.
This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type B under GHS regardless of the burning rate.
2. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 300 kg/min.
3. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 9.0 kg/(min × m²) unless the large-scale burning rate is less than 300 kg/min.
4. Organic peroxides of Type C, D, E, or F under GHS where the burning rate is not known.

Class II~~A~~. Those formulations that burn very rapidly and that pose a moderate reactivity hazard.
This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 140 kg/min, but less than 300 kg/min.
2. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m²), but less than 9.0 kg/(min × m²).

3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 140 kg/min.
4. Organic peroxide Type E under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m²).

Class IIB. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are:

1.	Organic peroxide Type C under GHS with a large-scale burning rate less than 140 kg/min.
2.	Organic peroxide Type C under GHS with a small-scale burning rate less than 2.2 kg/(min × m²).
3.	Organic peroxide Type D or E under GHS with a large-scale burning rate equal to or greater than 60 kg/min, but less than 140 kg/min.
4.	Organic peroxide Type D or E under GHS with a small-scale burning rate equal to or greater than 0.9 kg/(min × m²), but less than 2.2 kg/(min × m²).

Class III. Those formulations that burn rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are:

1. Organic peroxide Type D under GHS with a large-scale burning rate less than 60 kg/min.
2. Organic peroxide Type D under GHS with a small-scale burning rate less than 0.9 kg/(min × m²).
3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 10 kg/min, but less than 60 kg/min.
4. Organic peroxide Type E under GHS with a small-scale burning rate less than 0.9 kg/(min × m²).
5. Organic peroxide Type F under GHS with a large-scale burning rate equal to or greater than 10 kg/min.
6. Organic peroxide Type F under GHS regardless of the small-scale burning rate.

Class IV. Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type E or F under GHS with a large-scale burning rate less than 10 kg/min.

Class V. Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type G under GHS.

~~**Unclassified detonable**~~**Detonable.** *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition. This class is comprised of organic peroxide formulations which are organic peroxide Type A under GHS.

Reason: F26-24 and F270-24 were heard during CAH 1. Both proposals revised the definition of Organic Peroxide and its subclasses. This Comment combines the work in both F26-24 and F270-24 and makes revisions to the definitions in F26-24.Due to the expansion of international chemical trade, the United Nations (UN) developed the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. The Safety Data Sheets (SDS) utilize the GHS classification system, so the GHS category Types A through G will be included on the SDS and readily available. The burning rate of organic peroxides is not a mandatory requirement for an SDS; however, the Organic Peroxide Industry has committed to providing the burning rate on the SDS for each organic peroxide formulation. Class I Organic Peroxide also includes criteria that where the burning rate is not known, in other words not included on the SDS, then the material is assumed to be Class I.

The current definition and subclasses for Organic Peroxide in the I-Codes are subjective and not based on defined test methods or standardized set of criteria. Under the GHS, Organic Peroxide types are assigned based on the physical state, a determination of the formulations control and emergency temperature if applicable, and its performance under the testing protocol specified in the UN Manual of Tests and Criteria for Organic Peroxides. The GHS types and definitions proposed here are comparable to the generic transport types defined by the US Department of Transportation and reflect the relative hazard when packaged for transportation.

This proposal incorporates the readily available GHS classifications into the determination of the I-Code classification method. The I-Code Classes 1 through V are determined with a combination of the GHS classification and the burning rate of the organic peroxide.

Additionally, this proposal splits the current Organic Peroxide Class II into Class IIA and IIB; creating an additional subclassification. The range of the burning rate for the current Class II is quite broad—with a lower limit of 60 kg/min and an upper limit of 300 kg/min. By splitting Class II, it creates Class IIA (burning rate of 140 kg/min to 300 kg/min) and Class IIB (burning rate of 60 kg/min to 140 kg/min). This will provide two I-Code classifications for materials similarly classified by GHS (Type C, D and E) which are then separated by their burning rate into either Class IIA or IIB. This additional classification allows better control of separation distances versus quantity and other features that reflect the burning behavior of the materials, beyond just the explosion hazard represented by the GHS designation. Code change F270-24 correlates other provisions in Chapters 50 and 62 and the IBC to address this new organic peroxide classification.

This proposal combines the GHS Types and the burning rate of the specific material to determine the IFC/IBC Organic Peroxide classification. The matrix below compares the GHS Types and burning rate tests to the I-Code classification.

GHS TYPE	BURNING RATE TEST	IFC/IBC CLASSIFICATION						
		Detonable	I	IIA	IIB	III	IV	V
A	Large Scale kg/min	Any						
	Small Scale kg/(min × m²)	Any						
B	Large Scale kg/min		Any					
	Small Scale kg/(min × m²)		Any					
C	Large Scale kg/min		≥300	≥140; <300	<140			
	Small Scale kg/(min × m²)		≥9 [a]	≥2.2; <9	<2.2			
D	Large Scale kg/min		≥300	≥140; <300	≥60; <140	<60		
	Small Scale kg/(min × m²)		≥9 [a]	≥2.2; <9	≥0.9; <2.2	<0.9		
E	Large Scale kg/min			≥140	≥60; <140	≥10; <60	<10	
	Small Scale kg/(min × m²)			≥2.2	≥0.9; <2.2	<0.9		
F	Large Scale kg/min					≥10	<10	

	Small Scale kg/(min × m²)					Any	NA	
G	Large Scale kg/min							Any
	Small Scale kg/(min × m²)							Any

If the large-scale burning rate for the same material is less than 300 kg/min, the small-scale burning rate shall be disregarded.

NA – Not applicable

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to define and update storage classification of organic peroxides based on both the GHS transport type and burning rate. The information provided in this proposal helps both the code official and the code user to effectively implement the code. The proposal does not impact the cost of construction.

Comment (CAH2)# 435

F34-24

IFC: 203.6.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

203.6.1 Occupancy exemptions. Storage, use and handling of hazardous materials in accordance with Table ~~307.1.1 of the *International Building Code*~~ 5003.1.1(5) shall not be counted as contributing to maximum allowable quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of this code.

Reason: The new section 203 dealing with occupancies will be a great benefit to code users and assist in the application of the code. Section 203.6.1 refers to a table of functions and activities where the quantity of hazardous materials is not included in the maximum allowable quantity. This section refers to table in the IBC. This means that to properly classify an occupancy with hazardous materials it takes both the IFC and the IBC to accomplish the evaluation.

The reality is that the table is located in the IFC, and is the new Table 5003.1.1(5). The table in the IFC and the table in the IBC are identical. therefore, rather than sending the code user to the IBC, the reference is changed to Table 5003.1.1(5) in the IFC. In this manner, the code user can complete the occupancy classification using either the IBC or IFC, but does not need to use both.

This is an editorial change to simply reference the table in the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial code change. The reference is changed from a table in the IBC to a table in the IFC.

F34-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Disapproval is based upon concern that International Fire Code Table 5003.1.1(5) IFC is not necessarily the same exemptions as International Building Code Table 307.1.1 as these tables serve different purposes. (Vote 14-0)

F34-24

Individual Consideration Agenda

Comment 1:

IFC: 203.6.1, TABLE 5003.1.1(5)

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

203.6.1 Occupancy exemptions. Storage, use and handling of hazardous materials in accordance with Table 5003.1.1(5) shall not be counted as contributing to maximum allowable quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of this code.

Revise as follows:

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

Portions of table not shown remain unchanged.

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Flammable and combustible liquids and gases	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416 of the *International Building Code*.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

Reason: This item was Disapproved at CAH 1. It was disapproved for two reasons: 1) the table are not the same, 2) the tables have different purposes in each code.

Regarding the issue of the tables not being the same, that statement is correct. There is an editorial needed with regard to flammable finishing operations. The IFC wording is identical to the IBC wording which references a section in the IBC. The IFC needs to be be revised to include the reference to the IBC. This revision is purely editorial and is accomplished in this comment.

Further review of the tables in the IBC and IFC shows that the tables are identical - they are word for word, with references to the other code as needed. Therefore, whether the code user refers to either table during code application is immaterial. The end result is the same.

The initial goal of this code change was simply to allow the code user to accomplish occupancy classification using the IFC. That is the whole intent of duplicating the occupancy classification requirements from the IBC Chapter 3 to the IFC Chapter 2. The only difference between the two codes is that the exemptions table is located in IBC Chapter 3 and in IFC Chapter 50.

IBC Table 307.1.1 could be duplicated in IFC Chapter 2 and then the IFC would simply reference that table. But that would be foolish and redundant since the table already exists in the code as Table 5003.1.1(5). So the reference to Table 503.1.1(5) is appropriate. The bottom line is that it is the exact same table.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost associated with this change. There is no change in code requirements. This change enhances code user friendliness.

Comment (CAH2)# 564

F36-24

IFC: 304.1.3

Proposed Change as Submitted

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org)

2024 International Fire Code

Revise as follows:

304.1.3 Vegetation and Combustible Mulch. Weeds, grass, vines, combustible mulch or other growth that is capable of being ignited and endangering property, shall be cut down or prohibited and removed by the *owner* or occupant of the premises. Vegetation and combustible mulch clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

Reason: Over the past code cycles there has been concern over smoker habits and wildfires and combustible mulch, and the potential hazard they pose with combustion of exterior walls. This change focuses on providing protections from two ignition sources discarded cigarettes or pre-rolls (joints) and wildfires. Many fire service members, the UL fire fighter safety institute, and other material stakeholders, like the Vinyl Siding Institute, have been focused on this issue over close to 10 years or more. The problem identified is the spread of fire from the exterior into the unprotected attic space and then spreading quickly to other parts of the building either through discarded cigarettes or wildfire. The term that is used in the proposal is "combustible mulch" rather than "combustible ground cover" because there is the potential for misinterpretation when describing "ground cover", as it might be thought to refer to products placed on the ground during repairs or renovations and should not be regulated.

Over the decade, fire departments in the Washington, DC region (Loudon County, VA) have been confronted with structure fires which have demonstrated a consistent pattern of starting on the outside. These fires have the potential for rapid loss of structural integrity and catastrophic collapse before occupants are alerted. As attention has grown locally, it is apparent that this type of fire is becoming common on a national basis.

These fires tend to follow a distinct pattern. These fires start at a low point on the exterior ground or in a waste basket with discarded cigarette and spread vertically along the exterior wall producing flammable gases, which are readily admitted into the attic area through ventilation soffits. If not cooled, these heated gases accumulate and combust, creating rapidly spreading fire conditions in the attic area, often without occupant awareness. The unchecked fire can result in full roof involvement, creating a dangerous and difficult situation for occupants and fire fighters.

The group examined a number of structure fires which have exhibited the pattern described above. There is agreement over 3 common aspects. First, these fires often result from careless smoking habits or wildfires. Second, when the smoking materials are not properly disposed of, they come into contact with combustible ground cover adjacent to a building and, very commonly, this is mulch or wildfires (flying embers) start the combustible ground cover (kindling). And, last, the combustible exterior wall is a factor in the the growth of these fires into the attic space.

The careless smoker is an impediment to effective fire prevention efforts. The fire service has consistently provided data that shows smoking is the leading cause of fatal fires in the United States. Public fire and life safety efforts have been reasonably effective at communicating the message to not smoke in bed, and various medical organizations have demonstrated the health risk associated with “second hand” smoke. We now see that people are routinely smoking outside, at or near the entrance to a building, which increases the possibility of an accidental ignition of outside combustibles.

If one were to chronicle the actions of today’s smoker, it shows the last action they take when exiting a building is to “light up.” When returning inside, they often drop the cigarette near the entrance. Many smokers seem to believe that dropping a match or cigarette onto the combustible ground cover or into a flower pot is an effective method of extinguishment, however, this behavior often places the smoking material directly into the mulch, initiating the low fire described earlier.

Combustible mulch has become a common exterior decorative material which aids in suppressing weed growth while enhancing a

building's curb appeal. However, most mulch is a dead organic material, comprised of chipped wood, tree bark or pine needles. Mulch is most effective when it is maintained in a moist state, however it can dry out very quickly and become a readily ignitable fuel source. Because of its relatively small mass in comparison to its surface area, when ignited, it will progress and sustain open flame.

The group discussed a method in which to proceed, the interest being to add ress, in the quickest manner, industrial and social changes which could reduce the possibility of a fire on the outside of a building. Each aspect presents unique challenges for fire prevention efforts:

1. Changing the behavior of the smoker is an ongoing and difficult challenge, especially as social pressures have resulted in regulatory changes to require people to smoke outside of a building. Further development of the "fire safe" cigarette, by way of testing using mulch, could be deemed too costly for the industry, and would have no effect on improper disposal of matches. Thus, the quickest and most practical strategy for this aspect of the problem is to expand public fire and life safety education to focus on the hazards of improper disposal of smoking materials, coupled with enforcement of applicable requirements for regulation of smoking and disposal of products. However, in this age of "information overflow" it is questionable if this would result in widespread behavioral changes for smokers.

2. Regulating the use and placement of mulch, that the study group believes could have the quickest and most significant impact toward reducing the exterior fire problem, while additional strategies to address the other problems noted are pursued. The use of wood and wood related mulch for building decoration is purely optional. It is not a required construction component under current building codes. Therefore, regulations to curtail its use or require that it be separated from a building's combustible exterior are reasonable and could be codified on a national basis. On a large scale, the mere action of creating separation of combustible materials has been a wildland fire tactic for years. Several states and local jurisdictions have already employed this theory by either recommending or requiring that wood-based mulch be separated from exterior combustible walls:

1. The Virginia Department of Forestry recommends to "provide a minimum of an 18 inch clearance between landscaping mulch beds and combustible building materials" and to "ensure proper clearance to electric devices, such as decorative lights, by following the manufacturer's instructions;"

2. In Raleigh, NC, following a disastrous fire in a multi-family building, the city passed a pine straw mulch ordinance that bans the use of pine straw as ground cover within 10 feet of multi-family dwellings. The ordinance exempts 1 and 2-family dwellings, however, the city strongly encourages these homeowners to comply with the pine straw restrictions;

3. The Commonwealth of Massachusetts prohibits the new application of mulch within 18 inches around combustible exteriors of buildings, such as wood or vinyl but not brick or concrete. Residential buildings with six units or less are exempted from this regulation, but it is recommended that all homeowners adopt these safety practices. The regulation applies to all other buildings including commercial properties.

4. Ventura County, CA prohibits mulch and wood chips within the required "defensible space" zone (which ranges from 0' to 30' from the exterior of a building).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This change could increase the cost of construction and maintenance, as non-combustible mulch can be more expensive than combustible mulch.

Based on a search of multiple retail stores the following averages can be used: $4.00 for 2.0 cu. ft. of wood mulch and $4.00 for 0.5 cu. ft. of pebble landscape rock or pea gravel.

Estimated Immediate Cost Impact Justification (methodology and variables):

Typical retail cost of non-combustible mulch (pea gravel) vs. combustible mulch, can range from 2-5 times more expensive.

Estimated Life Cycle Cost Impact:

However typical combustible mulch will need to be replaced every 1-2 years vs. non-combustible mulch which may last 10+ years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Based on estimated lifecycle of typical combustible mulch vs. non-combustible mulch.

F36-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The language is too broad. Weeds, grass, or other growth that is capable of being ignited can be interpreted that you can't have any grass bordering the building. It was noted that there is an enforcement issue. It should not be applicable to single family homes because too many weekend workers go out and do their own stuff and it will put them in violation because they put mulch down. (Vote: 13-0)

F36-24

Individual Consideration Agenda

Comment 1:

IFC: 304.1.3, 304.1.3.1 (New)

Proponents: Matthew Dobson, VSI, VSI (mdobson@vinylsiding.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

304.1.3 Vegetation and Combustible Mulch. Weeds, grass, vines~~, combustible mulch~~ or other growth that is capable of being ignited and endangering property, shall be cut down or prohibited and removed by the *owner* or occupant of the premises. Vegetation ~~and combustible mulch~~ clearance requirements in wildland-urban interface areas shall be in accordance with the *International Wildland-Urban Interface Code*.

Add new text as follows:

304.1.3.1 Combustible Mulch. Combustible mulch shall be prohibited within five feet or less from buildings of Type V construction, Group R1 and R2 occupancies with combustible exterior wall coverings.

Reason: The committee wanted this more specifically applied, so the revision is focused on just where the hazard has been identified. Additionally submitted is data from NFIRS/NFPA which shows potentially the size of this issue.

Summary of NFIRS Data Related to Exterior Fires

NFPA (National Fire Protection Association) data, using the *Home Structures Fires-Supporting Tables* file, dated 10/2021.

Per the explanatory supporting tables information, “Estimates were derived from the US Fire Administration’s National Fire Incident Reporting System (NFIRS) and the NFPA annual fire department experience survey and include proportional shares of unknown or missing data. Fires are rounded to the nearest 100, deaths and injuries are rounded to the nearest ten, and property loss is rounded to the nearest million dollars. Inflation adjustments were made only for the trend tables. Percentages were calculated on unrounded

estimates."

After a review of the available data, PEPA felt that combustible mulch may be a part of fire activity in several data points noted in the obtained data tables for multi-family units:

Smoldering
BBQs
Hot Embers
Smoking
Abandon or discarded material
Exposure fires
Unclassified outside areas

The below statistics are directly from NFIRS data.
The first set, Tables 1–15, is based on fires (or deaths) in all home properties. Tables 1–12 show estimates of reported fires, causes, and circumstances in homes overall.

Leading Causes of Reported Home Structure Fires (Table 5, Page 7)

- Smoking materials accounted for 16,300 fires (5%)
- Exposure fire accounted for 11,700 (3%) of fires

Reported Home Structure Fires by Equipment Involved in Ignition (Table 7, Page 9)

- Grill, barbeque, or hibachi accounted for 5,300 (2%) of fires

Reported Home Structure Fires by Heat Source (Table 8, Page 11)

- Unclassified hot or smoldering object accounted for 24,300 (7%) of fires
- Smoking materials accounted for 16,300 fires (5%)

Reported Home Structure Fires by Factors Contributing to Ignition: 2015-2019 Annual Averages (Table 9, Page 14)

- Exposure fire accounted for 11,700 fires (3%)

Tables 1B–12B show comparable data for apartments or other multifamily housing.

Leading Causes of Reported Apartment or Multifamily Housing Structure Fires between 2015-2019 (Table 5B, Page 48)

- Smoking materials accounted for 5,900 fires (5%)
- Exposure fire accounted for 1,700 (2%) of fires

Reported Apartment or Multifamily Housing Structure Fire by Equipment Involved in Ignition (Table 7B, Page 50)

- Grill, barbeque, or hibachi accounted for 800 (1%) of fires

Reported Apartment or Multifamily Housing Structure Fires by Heat Source (Table 8B, Page 52)

- Unclassified hot or smoldering object accounted for 7,900 fires (7%)
- Smoking materials accounted for 5,900 fires (5%)

Reported Apartment or Multifamily Housing Structure Fires by Factor Contributing to Ignition (Table 9B, Pages 54 & 55)

- Abandoned or discarded material or product accounted for 17,000 (16%) of fires
- Heat source too close to combustible accounted for 11,000 (10%) of fires
- Exposure fire accounted for 1,700 (2%) of fires

After contacting NFPA staff, we determined that obtaining more detailed information is not possible; data is either unavailable or insufficient.

We feel that combustible mulch could have played a role in any of the obtained statistics, and limiting its use in multifamily units could help to reduce the risk.

Cost Impact: Increase

Estimated Immediate Cost Impact:

As noted in original proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original proposal.

Estimated Life Cycle Cost Impact:

See original proposal.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See original proposal.

Attached Files

- **NFPA Report.pdf**
  https://www.cdpaccess.com/comment/319/32151/files/download/7867/

Comment (CAH2)# 319

F40-24

IFC: APPENDIX O, SECTION 202, 304.1.1, O101.1, O102.1, O102.2, O102.3, O102.4, O102.5, O103.1, O103.2, O103.3, O104.1, O104.2, O104.3, SECTION O101, SECTION O102, SECTION O103, SECTION O104, SECTION O105, O105.1, TABLE O105.1

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., National Trash and Recycling Valet Association (wkoffel@koffel.com)

2024 International Fire Code

Delete and substitute as follows:

~~APPENDIX O~~
~~VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES~~

SECTION 305
VALET TRASH COLLECTION

Revise as follows:

VALET TRASH COLLECTION. ~~An intermediary~~ service that removes trash or recycling materials placed outside of *dwelling units* or *sleeping units* for ~~final~~ collection.

Delete without substitution:

~~**304.1.1 Valet trash.** *Valet trash collection* shall be permitted only where *approved*. The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the jurisdiction.~~

Revise as follows:

~~**O101.1**~~ **305.1 General..** *Valet trash collection* in Group R-2 occupancies shall comply with this ~~appendix~~ section.

~~**O102.1**~~ **305.2 ~~General~~ Containers.** Containers used for *valet trash collection* shall comply with Sections ~~O102.2~~ 305.2.1 through ~~O102.5~~ 305.2.4.

~~**O102.2**~~ **305.2.1 Integrity.** Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and equipped with lids. Lids shall be in the fully closed position.

~~**O102.3**~~ **305.2.2 Height.** Containers shall not exceed 30 inches (762 mm) in height.

~~**O102.4**~~ **305.2.3 Capacity and limit.** Individual containers shall not exceed 2.0 cubic feet (15 gallons; 56.8 L) in capacity. Only one trash or recycling container per *dwelling unit* or *sleeping unit* shall be permitted to be placed outside the *dwelling unit* or *sleeping unit* at one time. Trash and recycling containers shall not be placed outside a *dwelling unit* or *sleeping unit* at the same time.

~~**O102.5**~~ **305.2.4 Construction materials.** Containers and lids used for *valet trash collections* shall be constructed entirely of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

~~**O103.1**~~ **305.3 ~~General~~ Placement of containers..** Placement of containers used for *valet trash collection* outside a *dwelling unit* or *sleeping unit* shall comply with Sections ~~O103.2~~ 305.3.1 and ~~O103.3~~ 305.3.2.

~~O103.2~~ **305.3.1 Minimum means of egress width.** Containers used for *valet trash collection* shall not obstruct the minimum required egress width.

~~O103.3~~ **305.3.2 Stairways.** Containers used for *valet trash collection* shall not be placed on stair risers, within minimum required stairway landing dimensions or anywhere in an *interior exit stairway*.

~~O104.1~~ **305.4 Time limits.** Filled containers used for valet trash or recycling services shall not be placed outside a *dwelling unit* for more than 6 hours within any 24-hour period. Empty *approved* containers used for valet trash or recycling services shall not remain in a *corridor* for more than 12 continuous hours in a 24-hour period.

~~O104.2~~ **305.5 Collection rules.** The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring and enforcing all *valet trash collection* rules. A copy of the rules shall be provided to the *fire code official* upon request.

~~O104.3~~ **305.6 Suspension of service.** The *fire code official* has the authority to order the suspension of *valet trash collection* that is not in compliance with this ~~appendix~~ Section.

Delete without substitution:

~~SECTION O101 SCOPE~~

~~SECTION O102 CONTAINERS~~

~~SECTION O103 CONTAINER LOCATION~~

~~SECTION O104 ADDITIONAL REQUIREMENTS~~

~~SECTION O105 REFERENCED STANDARDS~~

~~**O105.1 General.** See Table O105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.~~

~~**TABLE O105.1 REFERENCED STANDARDS**~~

~~STANDARD ACRONYM~~	~~STANDARD NAME~~	~~SECTIONS HEREIN REFERENCED~~
~~ASTM E1354—17~~	~~*Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*~~	~~O102.5~~

Reason: The proponents of F8-21 indicated that Section 304.1.1 was needed because prior editions of the IFC did not prohibit valet trash collection services. As such, the proponents felt the need for users of valet trash collection serviced to receive approval and for the owner and code official to determine the appropriate requirements.

At the same time, the FCAC and industry worked to develop Appendix O which contains requirements for valet trash collection services where Appendix O is adopted. The purpose of the proposal is to relocate the provisions of Appendix O into a new Section of the IFC. As such, there will be specific requirements that apply to valet trash collection services.

The proposed text requires that the collection rules established between the service provider and the building owner/manager be provided to the fire official. The fire official has the authority to suspend the service when the collection rules and the requirements of Section 305 are not met. As such, the intent of the proponents of F8-21 is met because the fire official has stated requirements that must be met and ability to suspend the service when the requirements are not met.

Technically, the proposal does not change the provisions of Appendix O.

It should also be noted that similar provisions are included in the 2024 Edition of NFPA 101.

The change to the definition is consistent with concerns expressed during the last revision cycle related to the definition contained in F8-21. Actually, the ICC membership approved two definitions during the last cycle since there was also a definition in Appendix O that was also approved. The concern with the existing definition is that it could apply more broadly to the curb side trash collection services.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Moving the requirements in Appendix O do the body of the IFC does not result in an impact on the cost of construction.

F40-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The appendix was just added to 2024 IFC and as it was stated, it is not known yet how this is going to affect the adoption. Since it is in the appendix, jurisdictions do have the opportunity to allow it, if it is appropriate in the location. Until it is known if there are problems that are created either with it or without it, then it should remain where it is. Leaving it in the appendix allows some jurisdictions to adopt and follow it and it allows others not to. (Vote: 12-2)

F40-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 305, SECTION 202, 304.1.1, 305.1, 305.2, 305.2.1, 305.2.2, 305.2.3, 305.2.4, 305.3, 305.3.1, 305.3.2, 305.4, 305.5, 305.6, SECTION O101, SECTION O102, SECTION O103, SECTION O104, SECTION O105, O105.1, TABLE O105.1

Proponents: William Koffel, Koffel Associates, Inc., National Trash and Recycling Valet Association (wkoffel@koffel.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 305
VALET TRASH COLLECTION

VALET TRASH COLLECTION. A service that removes trash or recycling materials placed outside of *dwelling units* or *sleeping units* for collection.

~~**304.1.1 Valet trash.** *Valet trash collection* shall be permitted only where *approved*. The *owner* and *valet trash collection* service provider shall comply with the rules and limitations established by the jurisdiction.~~

305.1 General. *Valet trash collection* in Group R-2 occupancies shall be permitted only where *approved.* The owner and the *valet trash collection* service shall comply with this section.

305.2 Containers. Containers used for *valet trash collection* shall comply with Sections 305.2.1 through 305.2.4.

305.2.1 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and equipped with lids. Lids shall be in the fully closed position.

305.2.2 Height. Containers shall not exceed 30 inches (762 mm) in height.

305.2.3 Capacity and limit. Individual containers shall not exceed 2.0 cubic feet (15 gallons; 56.8 L) in capacity. Only one trash or recycling container per *dwelling unit* or *sleeping unit* shall be permitted to be placed outside the *dwelling unit* or *sleeping unit* at one time. Trash and recycling containers shall not be placed outside a *dwelling unit* or *sleeping unit* at the same time.

305.2.4 Construction materials. Containers and lids used for *valet trash collections* shall be constructed entirely of noncombustible materials or of materials that comply with Section 304.3.2. ~~meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.~~

305.3 Placement of containers.. Placement of containers used for *valet trash collection* outside a *dwelling unit* or *sleeping unit* shall comply with Sections 305.3.1 and 305.3.2.

305.3.1 Minimum means of egress width. Containers used for *valet trash collection* shall not obstruct the minimum required egress width.

305.3.2 Stairways. Containers used for *valet trash collections* shall not be placed on stair risers, within minimum required stairway landing dimensions or anywhere in an *interior exit stairway*.

305.4 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a *dwelling unit* for more than 6 hours within any 24-hour period. Empty *approved* containers used for valet trash or recycling services shall not remain in a *corridor* for more than 12 continuous hours in a 24-hour period.

305.5 Collection rules. The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring and enforcing all *valet trash collection* rules. A copy of the rules shall be provided to the *fire code official* upon request.

305.6 Suspension of service. The *fire code official* has the authority to order the suspension of *valet trash collection* that is not in compliance with this Section.

Delete without substitution:

~~SECTION O101~~

~~**SCOPE**~~

~~**SECTION O102**~~
~~**CONTAINERS**~~

~~**SECTION O103**~~
~~**CONTAINER LOCATION**~~

~~**SECTION O104**~~
~~**ADDITIONAL REQUIREMENTS**~~

~~**SECTION O105**~~
~~**REFERENCED STANDARDS**~~

~~**O105.1 General.** See Table O105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.~~

~~**TABLE O105.1 REFERENCED STANDARDS**~~

~~STANDARD ACRONYM~~	~~STANDARD NAME~~	~~SECTIONS HEREIN REFERENCED~~
~~ASTM E1354—17~~	~~*Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*~~	~~O102.5~~

Reason: The Public Comment seeks to approve the original F40-24 proposal with two modifications.

As requested, the language from the 2024 IFC has been retained that requires approval of the fire official for valet trash collection to be provided and it explicitly states that the owner and the service provided need to comply with the requirements in the section. The second modification is in Section 305.2.4 and it incorporates the language approved by the Committee in F37-24.

The remainder of the proposal deleted Appendix O and transfers the existing language from Appendix O into a new Section 305. As stated in the original proposal, this provides the requirements in the body of the Code that the owner and the service provider are to meet. The language in the 2024 IFC does not provide specific requirements that need to be met (referenced in existing paragraph 304.1.1 and relocated to 305.1 in the Public Comment) unless the jurisdiction has also adopted Appendix O.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Moving the requirements in Appendix O to the body of the IFC does not result in an impact on the cost of construction.

Comment (CAH2)# 563

F41-24

IFC: 308.3.1

Proposed Change as Submitted

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org)

2024 International Fire Code

Revise as follows:

308.3.1 Open-flame decorative devices. Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids ~~and LP-gas~~ shall not be used.
2. Fuel gas appliances shall be listed and installed in accordance with the *International Fuel Gas Code*.
3. ~~2.~~ Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
4. ~~3.~~ The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
5. ~~4.~~ The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical. **Exception:** Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
6. ~~5.~~ The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
7. ~~6.~~ Chimneys shall be made of noncombustible materials and securely attached to the open-flame device. **Exception:** A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.
8. ~~7.~~ Fuel canisters shall be safely sealed for storage.
9. ~~8.~~ Storage and handling of *combustible liquids* shall be in accordance with Chapter 57.
10. ~~9.~~ Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chimney.
11. ~~10.~~ Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

Reason: There is no reason to prohibit fuel gas appliances for use with natural gas or propane when those appliances are listed and installed in accordance with the fuel gas code. The International Fuel Gas Code references the following decorative appliances that may have open flames:

ANSI Z21.60 Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces

ANSI Z21.97 Outdoor Decorative Appliances

There are potentially other listed appliances that may be suitable for this application as well. LP-Gas systems are closed systems that cannot spill like a container for a combustible or flammable liquid. There are safety features built into the performance standards for these appliances that other open flame devices may not have.

Bibliography: The following documents are referenced in the reason statement:

International Fuel Gas Code

ANSI Z21.60 Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces

ANSI Z21.97 Outdoor Decorative Appliances

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

There may be an increased cost associated with installing fuel gas decorative appliances as opposed to other open flame, decorative appliances. The cost of the appliance installed can be a few hundred dollars. If the appliance is fueled by a hard-piped gas system, the cost to run that piping may be a few hundred dollars as well. Total cost could be between $500 and $1,000, depending on the type of appliance and additional features.

Estimated Immediate Cost Impact Justification (methodology and variables):

The methodology I used to determine the cost impact was based on personal experience.

Estimated Life Cycle Cost Impact:

Assuming that the fuel gas appliance functions properly for 15 years, the life cycle cost impact would include the initial installation and the fuel gas that it takes to operate the appliance. Roughly, the cost of the fuel gas over that 15-year period would be $1,500, so the total life cycle cost impact would be between $2,000 and $2,500.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

I used current gas pricing for propane and an estimated 200 hours of operation per year, or 3,000 hours over the life of the appliance. For a 20,000 Btuh appliance, that equates to about 750 gallons of propane. At $2.00 per gallon, that equates to $1,500 over the life cycle.

F41-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata

2024 International Fire Code

Revise as follows:

308.3.1 Open-flame decorative devices.
Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids ~~and LP-gas~~ shall not be used.
2. Fuel gas appliances shall be listed and installed in accordance with the *International Fuel Gas Code*.
3. ~~2.~~ Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a
4. ~~3.~~ The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per
5. ~~4.~~ The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.7
6. of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
7. ~~5.~~ The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where open
8. seconds.
9. ~~6.~~ Chimneys shall be made of noncombustible materials and securely attached to the open-flame device. **Exception:** A chimney

~~7.~~ Fuel canisters shall be safely sealed for storage.

8.

~~8.~~ Storage and handling of *combustible liquids* shall be in accordance with Chapter 57.

9.

~~9.~~ Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chim

10.

~~10.~~ Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away fr

11.

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was it makes a good connection for the fire code official to have a pointer to the IFGC for these types of appliances when they are installed. (Vote: 13-0)

F41-24

Individual Consideration Agenda

Comment 1:

IFC: 308.3.1

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

308.3.1 Open-flame decorative devices. Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids shall not be used.
2. ~~Fuel gas appliances shall be listed and installed in accordance with the International Fuel Gas Code.~~
   Flammable gases shall not be used unless installed as part of a permanent appliance in accordance with the *International Fuel Gas Code*.
3. Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
4. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
5. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical. **Exception:** Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.

6. The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
7. Chimneys shall be made of noncombustible materials and securely attached to the open-flame device. **Exception:** A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.
8. Fuel canisters shall be safely sealed for storage.
9. Storage and handling of *combustible liquids* shall be in accordance with Chapter 57.
10. Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chimney.
11. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

Reason: This comment is being submitted at the request of the Fire Code Action Committee, which expressed concern about the potential for propane cylinders to be used inside buildings. Such practice would be a violation of the IFC as well as NFPA 58. The proposed text was arrived at by members of the FCAC.

The proposed changes clarify that only listed decorative appliances complying with the International Fuel Gas Code and connected to fuel gas piping systems should be installed in assembly buildings.

Bibliography: International Fuel Gas Code

NFPA 58 "Liquefied Petroleum Gas Code"

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal has no bearing on the cost of construction in that decorative appliances are optional in any building and therefore deciding to install a decorative appliance is a discretionary expense borne by the building owner.

Comment (CAH2)# 547

F43-24

IFC: 309.2

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Revise as follows:

309.2 ~~Use in hazardous (classified) locations~~ Listing. Powered industrial trucks ~~used in areas designated as hazardous (classified) locations in accordance with NFPA 70~~ shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

Reason: Regardless of the environment where used, powered industrial trucks should be listed and labeled for the environment intended in accordance with NFPA 505 (Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations).

This proposal clarifies the intended reference to and compliance with NFPA 505. The scope of NFPA 505 covers all environments, not just hazardous (classified) environments.

The standards, UL 558 (Industrial Trucks, Internal Combustion Engine Powered and UL 583 (Electric Battery Powered Industrial Trucks) are both referenced in NFPA 505 and address the associated hazards for both internal combustion engine powered (such as LP-gas, gasoline, diesel and CNG) and electric battery powered (such as Li-ion battery) industrial trucks.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No increase in the cost of construction. NFPA 505 is already in use and compliance is an existing IFC requirement.

F43-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The electrical classification should be clearly identified where required. The listing or labeling of the equipment being intended for use makes it less usable to the reader that there is a hazard present, and it should be addressed. Changing it from hazardous locations to all locations and everything really expands this requirement. There is no direction for an existing powered industrial truck that would move into a requirement for listing in a non-hazardous area. (Vote: 9-4)

F43-24

Individual Consideration Agenda

Comment 1:

IFC: 309.2

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

309.2 Use in hazardous (classified) locations. Fuel ~~Powered~~ powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be *listed* and *labeled* for use in the environment intended in accordance with NFPA 505.

Reason: This change clarifies the requirements in section 309 apply to only fuel-powered industrial trucks. This change will correlate with other changes approved at CAH #1 that created a separate section and specific requirements for battery-powered industrial trucks.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No increase in the cost of construction. NFPA 505 is already in use and compliance is an existing IFC requirement.

Comment (CAH2)# 236

F44-24

IFC: CHAPTER 3, SECTION 310, 310.1, 310.1.1 (New), 310.2, 310.2.1, 310.3, 310.4, 310.5, 310.6, 310.7, 310.8, 1207.10.4.1, 1207.10.7.7

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

CHAPTER 3
GENERAL REQUIREMENTS

Revise as follows:

SECTION 310
SMOKING AND VAPING

310.1 General. ~~The smoking~~ Smoking, vaping or carrying of a lighted pipe, cigar, cigarette or any other type of smoking or vaping paraphernalia or material is prohibited in the areas indicated in Sections 310.2 through 310.8.

Add new text as follows:

310.1.1 Applicability. Wherever, sections of the present code reference smoking, both smoking and vaping are intended to be referenced, unless otherwise stated.

Revise as follows:

310.2 Prohibited areas. Smoking and vaping shall be prohibited where conditions are such as to make such practices ~~smoking~~ a hazard, and in spaces where flammable or combustible materials are stored or handled.

Exception: In Group I-2 occupancies, patients shall be permitted to smoke or vape in designated patient care areas based on the clinical needs of the patient.

310.2.1 Group I-2. In Group I-2 occupancies, smoking and vaping shall be prohibited in patient care areas or where oxygen is used, stored or handled.

310.3 "No Smoking" signs. The *fire code official* is authorized to order the posting of "No Smoking" or "No Vaping" signs or the international symbol for no smoking in a conspicuous location in each structure or location in which smoking or vaping is prohibited. The content, lettering, size, color and location of required "No Smoking" or "No Vaping"signs shall be *approved*. **Exception:** "No Smoking" or "No Vaping" signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

310.4 Removal of signs prohibited. ~~A posted~~ Posted "No Smoking" or "No Vaping" signs ~~sign~~ shall not be obscured, removed, defaced, mutilated or destroyed.

310.5 Compliance with "No Smoking" or "No Vaping" signs. Smoking or vaping shall not be permitted nor shall a person smoke, vape, throw or deposit any lighted or smoldering substance in any place where "No Smoking" or "No Vaping" signs are posted.

310.6 Ash trays. Where smoking or vaping are ~~is~~ permitted, suitable noncombustible ash trays or match receivers shall be provided on

each table and at other appropriate locations. In Group I-2 occupancies, noncombustible metal containers with self-closing covers shall be provided in areas where smoking is permitted.

310.7 Burning objects. Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manner that could cause ignition of other combustible material.

Revise as follows:

310.8 Hazardous environmental conditions. Where the *fire code official* determines that hazardous environmental conditions necessitate controlled use of smoking or vaping materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in *approved* designated smoking or vaping areas.

1207.10.4.1 Deployment documents. The following information shall be provided with the operation permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the *construction documents* required by Section 1207.1.5.
2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking or no vaping signs.
4. Description of fencing to be provided around the ESS, including locking methods.
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation and explosion control, if provided.
6. For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates.
7. Location and description of local staging stops during transit to the deployment site. See Section 1207.10.7.5.
8. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.
9. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.
10. Contact information for personnel who are responsible for maintaining and servicing the equipment, and responding to emergencies as required by Section 1207.1.8.1. [material based on NFPA 855 (2023)]

1207.10.7.7 Smoking and Vaping. Smoking and vaping shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.

Reason: Recently it was found that vaping and vaping materials can also provide an ignition hazard. In fact, in California a severe fire incident has been determined to be related to vaping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

There will be some added cost associated with revised or new signs dealing with vaping. Research indicates that new “no smoking signs” and “no smoking no vaping signs” are available at the same cost. The additional cost would be in the replacement of existing signage. The cost impact for new construction should be negligible or $0.

Estimated Immediate Cost Impact Justification (methodology and variables):

The submitters are not able to estimate the added cost.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The definition approved by F30-24 adds clarity to what is covered by “no smoking” and by changing the sign, there is then going to be a laundry list on signs. It is going to say no smoking, no smoking this, no smoking that, no vaping. Instead by keeping the sign simple and tying it back to the definition just approved is all that is necessary in the code. The proposal reason statement needs to include the actual evidence that supports the change. (Vote: 14-0)

F44-24

Individual Consideration Agenda

Comment 1:

IFC: CHAPTER 3, SECTION 310, 310.1

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

CHAPTER 3
GENERAL REQUIREMENTS

SECTION 310
SMOKING AND VAPING

Revise as follows:

310.1 General. Smoking, vaping or carrying ~~of~~ a lighted pipe, cigar, or cigarette or carrying any other type of smoking or vaping paraphernalia or material is prohibited in the areas indicated in Sections 310.2 through 310.8.

Reason: The committee considered that adding the information on vaping in every section referencing smoking was excessive and would lead to potential problems of omissions. The committee referenced the new definition approved in F30 as the approach. However, since definitions are not enforceable requirements, this comment adds enforceability by simply making the change in the charging section and not making any change in any other section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Just like the new definition approved in F30, this has the potential to slightly increase costs but quantification is not possible.

F45-24

IFC: SECTION 312, 312.1, 312.2, 312.3, 1207.11.7.1, FIGURE 1207.11.7.1, 1207.11.7.2, 1207.11.7.3, 1207.11.7

Proposed Change as Submitted

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov)

2024 International Fire Code

SECTION 312
VEHICLE IMPACT PROTECTION

Revise as follows:

312.1 General. Vehicle impact protection required by this code within a garage or elsewhere ~~shall be provided by posts that comply with Section 312.2 or by other *approved* physical barriers that comply with Section 312.3~~ in accordance with Section 312.1.1 or 312.1.2 shall be provided with impact protection in accordance with Section 312.1.3.

Delete without substitution:

~~**312.2 Posts.** Guard posts shall comply with all of the following requirements:~~

1. ~~Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.~~
2. ~~Spaced not more than 4 feet (1219 mm) between posts on center.~~
3. ~~Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.~~
4. ~~Set with the top of the posts not less than 3 feet (914 mm) above ground.~~
5. ~~Located not less than 3 feet (914 mm) from the protected object.~~

~~**312.3 Other barriers.** Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.~~

Revise as follows:

~~**1207.11.7.1**~~ **312.1.1 Garages.** Where ~~an ESS~~ equipment or appliances are ~~is~~ installed or located in the normal driving path of vehicle travel within a garage, impact protection complying with Section ~~1207.11.3~~ 312.1.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure ~~1207.11.7.1~~ 312.1.2):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ~~ESS~~ equipment or appliances installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.

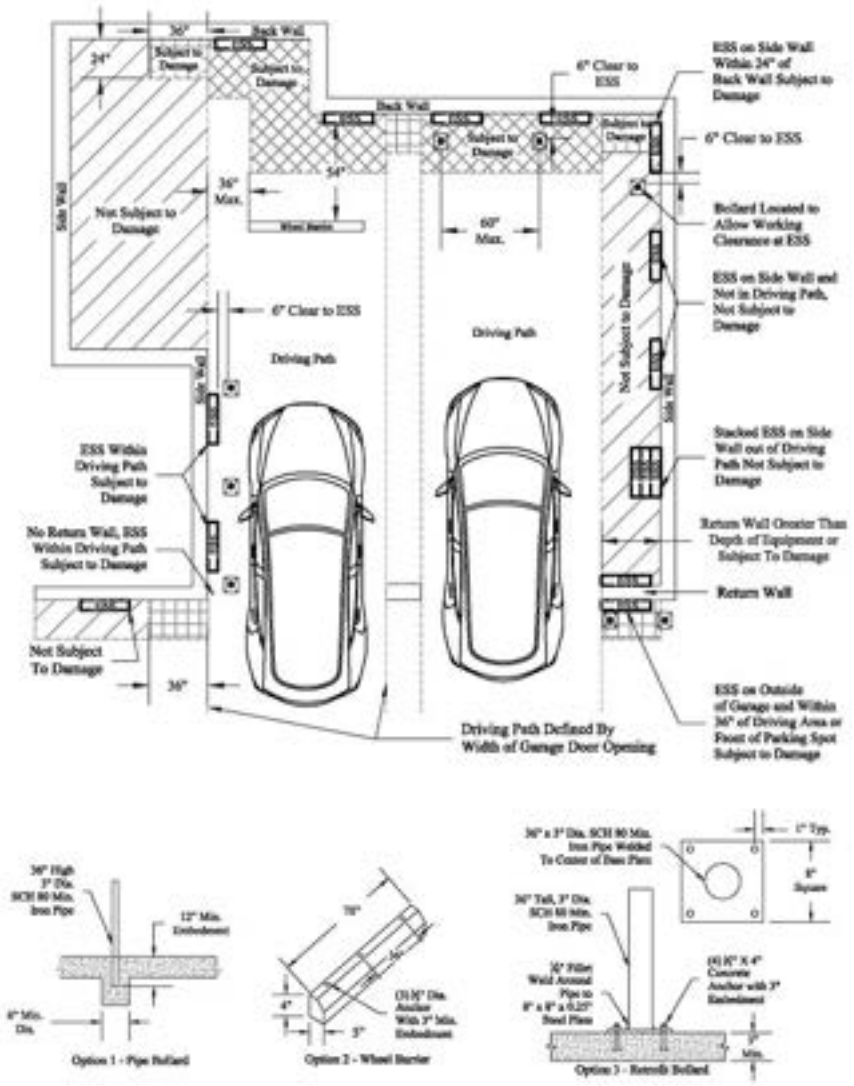


FIGURE ~~1207.11.7.1~~ 312.1.1 ~~ESS~~ VEHICLE IMPACT PROTECTION

~~1207.11.7.2~~ 312.1.2 Other locations subject to vehicle impact. Where ~~an ESS~~ a feature, appliance or equipment is installed in a location other than as defined in Section ~~1207.11.7.1~~ 312.1.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section ~~1207.11.7.3~~ 312.1.3.

~~1207.11.7.3~~ 312.1.3 Impact protection options. Where ~~ESS~~ a feature, appliance or equipment is required to be protected from impact in accordance with Section ~~1207.11.7.1~~ 312.1.1 or ~~1207.11.7.2~~ 312.1.2, such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from ~~an ESS~~ a feature appliance or equipment.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼-inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ~~ESS~~ feature, appliance or equipment.
   1.3. Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ~~ESS~~ feature, appliance or equipment.

2. Wheel barriers constructed in accordance with one of the following:
   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ~~ESS~~ feature, appliance or equipment. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).
   2.2. Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.

3. *Approved* method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.

1207.11.7 Protection from impact. ESS installed in a location subject to vehicle damage ~~in accordance with Section 1207.11.7.1 or 1207.11.7.2~~ shall be provided with impact protection in accordance with Section ~~1207.11.7.3~~ 312.

Reason: Last cycle comprehensive guidance was developed in Section 1207 for ESS subject to vehicle impact due to the lack of sufficient guidance within the International Series of codes. Recognized options for impact protection within garages was added in addition to ballads.

This proposal takes that comprehensive language and replaces the existing language in Section 312 to provide for the more comprehensive guidance for any location the fire code requires impact protection for.

Section 1207.11.7 is modified to point to Section 312 as occurs throughout the fire code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not create a new reuirement, it takes existing language proividing greater detail and increased methods of compliance and relocates it to a section covering the same topic.

F45-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Though the intent was good there were a variety of concerns with this proposal in its current form. A feature or appliance can be a wide variety of things which may not be the intent of this section. More wording to clarify that these provisions apply "where required" is necessary. These revisions may also cause confusion for other types of needs for impact protection besides within a garage. The language should be carefully reviewed for the use of "ESS." (Vote 8-6)

F45-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 312, 312.1, 312.1.1 (New), 312.2, 312.3, 312.1.1, FIGURE 312.1.1, 312.1.2, 312.4 (New), 312.4.1 (New), 312.1.3, 1207.11.7

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Darcy Davidson, Carlsbad Fire Department, California Fire Prevention Officers (darcy.davidson@carlsbadca.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 312
VEHICLE IMPACT PROTECTION

Revise as follows:

312.1 General. Vehicle impact protection required by this code ~~within a garage or elsewhere in accordance with Section 312.1.1 or 312.1.2 shall be provided with impact protection in accordance with Section 312.1.3~~shall be provided by posts that comply with Section 312.2 or by other *approved* physical barriers that comply with Section 312.3.

Add new text as follows:

312.1.1 Detached one- and two-family dwellings and townhouses. Impact protection required for detached one-and two-family dwellings and townhouses shall be provided in accordance with Section 312.4

Revise as follows:

312.2 Posts. Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.

5. Located not less than 3 feet (914 mm) from the protected object.

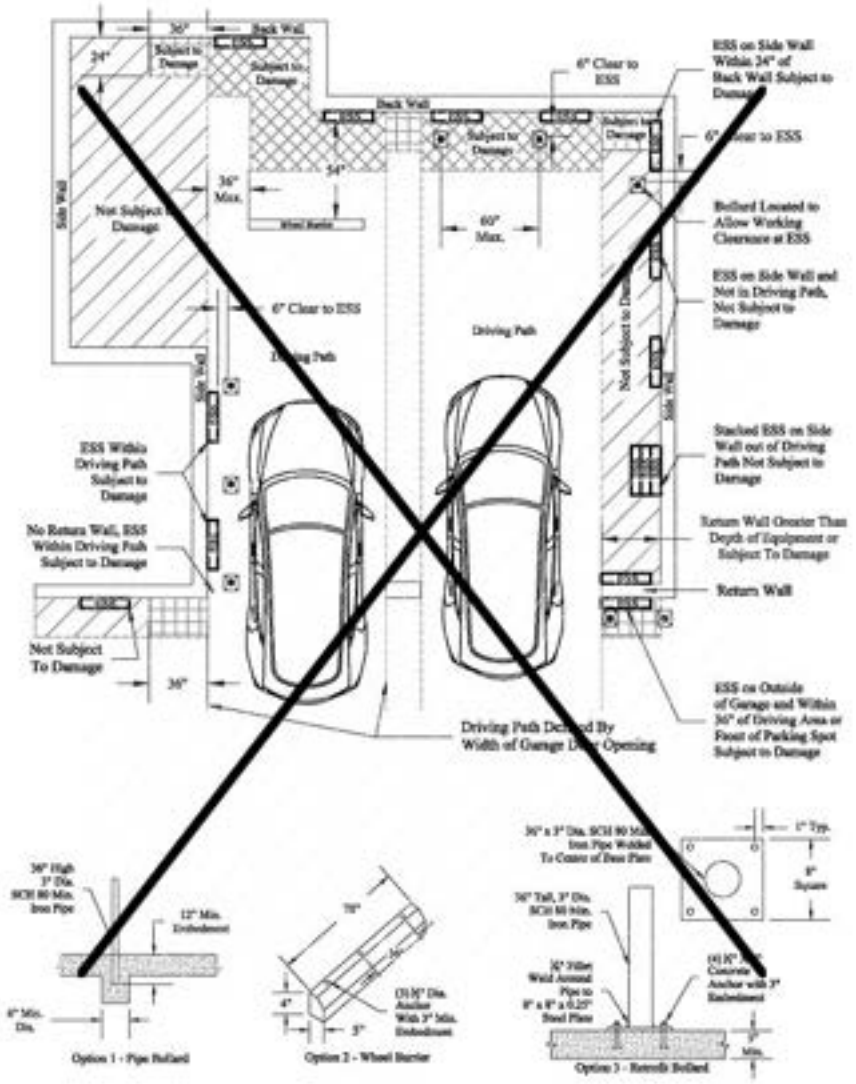
312.3 Other barriers. Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.

Delete without substitution:

~~**312.1.1 Garages.** Where equipment or appliances are installed or located in the normal driving path of vehicle travel within a garage, impact protection complying with Section 312.1.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure 312.1.2):~~

1. ~~On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.~~
2. ~~On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.~~

~~**Exception:** Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, equipment or appliances installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.~~



~~FIGURE 312.1.1~~ VEHICLE IMPACT PROTECTION

~~312.1.2 Other locations subject to vehicle impact.~~ ~~Where a feature, appliance or equipment is installed in a location other than as defined in Section 312.1.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section 312.1.3.~~

Add new text as follows:

312.4 Detached one- and two-family dwellings and townhouses. Where equipment or appliances are installed or located in the normal driving path of vehicle travel, impact protection shall comply with Sections 312.4.1 and 312.4.2.

312.4.1 Normal driving path within a garage. The normal driving within a garage the path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for equipment or appliances installed at either of the following locations:

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, equipment or appliances

installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.

~~312.1.3~~ **312.4.2 Impact protection options.** Where a feature, appliance or equipment is required to be protected from impact ~~in accordance with Section 312.1.1 or 312.1.2~~, such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) froma feature appliance or equipment.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼-inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the feature, appliance or equipment.
   1.3. Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the feature, appliance or equipment.
2. Wheel barriers constructed in accordance with one of the following:
   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the feature, appliance or equipment. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).
   2.2. Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.
3. *Approved* method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.

1207.11.7 Protection from impact. ESS installed in a location subject to vehicle damage shall be provided with impact protection in accordance with Section 312.

Reason: In response to testimony and the committee's comments the proposal has been modified to leave existing sections 312.1 through 312.3 in place and unmodified.

A new Section 312.1.1 has been added addressing detached one- and two-family dwellings and townhouses with a pointer to new Section 312.4.

The protection language from 1207 has been brought over to only apply to the detached one- and two-family dwellings and townhouses.

The language has been modified to eliminate the reference to "ESS features" and to simply apply to "appliance or equipment".

Where the language on "normal driving path" previously only applied within a garage, the paragraph has been broken out to apply the vehicle driving path generically since impact protection could be required outside a garage, then the within the garage language is added as a subsection.

The example image has been deleted with the intent to add that to the IFC Commentary should this language be approved, the writing stsyele of teh IFC typiocally does not include images within the technical content.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not create a new reuirement, it takes existing language proividing greater detail and increased methods of compliance and relocates it to a section covering the same topic.

Comment (CAH2)# 669

Comment 1:

IFC: SECTION 312, 312.1, 312.2, 312.3, 312.4 (New), 312.1.1, FIGURE 312.1.1, 312.1.2, 312.1.3, 1207.11.7

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 312
VEHICLE IMPACT PROTECTION

312.1 General. Vehicle impact protection required by this code ~~within a garage or elsewhere~~ shall be provided by posts that comply with Section 312.2 or by other *approved* physical barriers that comply with Section 312.3. ~~in accordance with Section 312.1.1 or 312.1.2 shall be provided with impact protection in accordance with Section 312.1.3.~~ ESS in garages shall be protected from vehicle impact as required in Section 312.4.

312.2 Posts. Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

312.3 Other barriers. Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.

Add new text as follows:

312.4 Protection of ESS from impact.. ESS installed in a location subject to vehicle damage in accordance with Section 324.1 or 324.2 shall be provided with impact protection in accordance with Section 324.3.

~~**312.1.1**~~ **312.4.1 ESS in ~~Garages~~ garages.** Where ~~equipment or appliances are~~ an ESS is installed ~~or located~~ in the normal driving path of vehicle travel within a garage, impact protection complying with Section ~~312.1.3~~ 312.4.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure ~~312.1.2~~ 312.4.1):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.

2. On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ~~equipment or appliances~~ ESS installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.

Revise as follows:

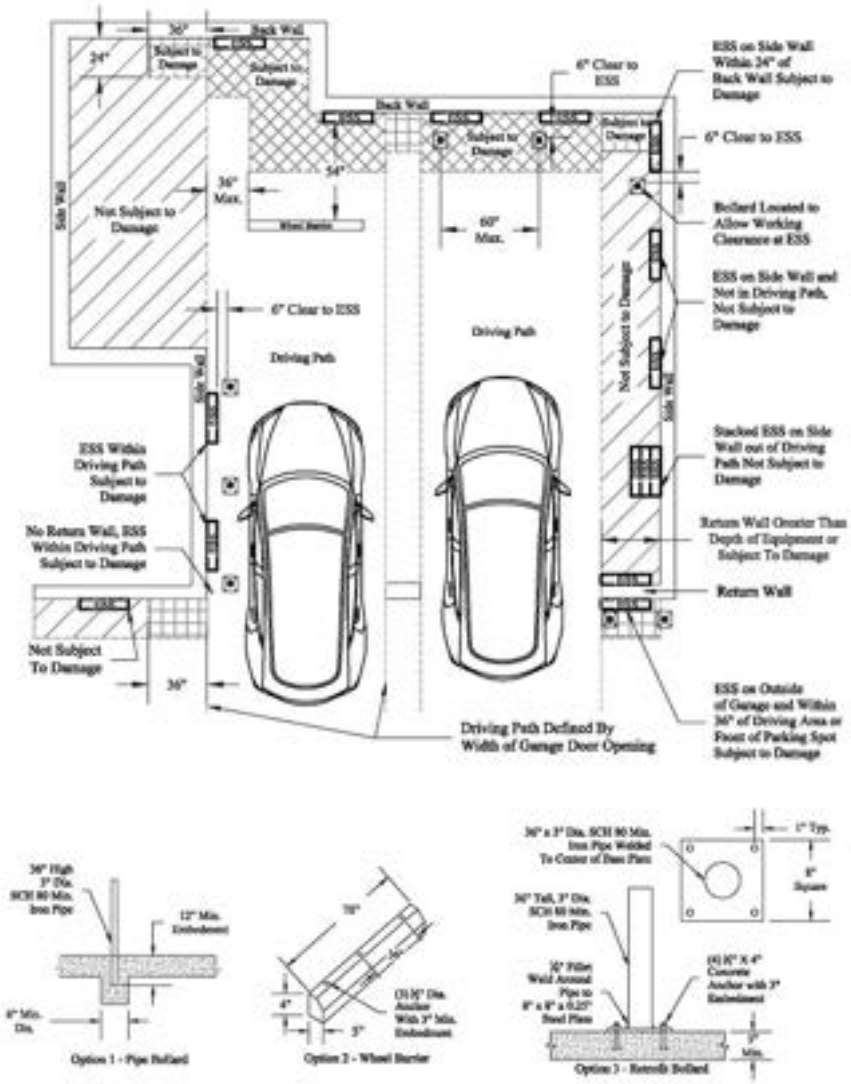


FIGURE ~~312.1.1~~ 312.4.1 ESS VEHICLE IMPACT PROTECTION

~~312.1.2~~ 312.4.2 Other ESS locations subject to vehicle impact. Where ~~a feature, appliance or equipment~~ an ESS is installed in a location other than as defined in Section ~~312.1.1~~ 312.4.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section ~~312.1.3.~~ 312.4.3.

~~312.1.3~~ 312.4.3 ESS ~~Impact~~ impact protection options. Where ~~a feature, appliance or equipment~~ ESS is required to be protected from impact in accordance with Section ~~312.1.1~~ 312.4.1 or ~~312.1.2~~ 312.4.2, such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:

   1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from ~~a feature appliance or equipment.~~ an ESS.

   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼-inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ~~feature, appliance or equipment.~~ ESS.

   1.3. Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ~~feature, appliance or equipment.~~ ESS.

2. Wheel barriers constructed in accordance with one of the following:

   2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the feature, appliance or equipment. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).

   2.2. Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.

3. *Approved* method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.

1207.11.7 Protection from impact. ESS installed in a location subject to vehicle damage shall be provided with impact protection in accordance with Section 312.

Reason: The Committee comments for F45-24 indicated good intent but a variety of concerns. The Committee expressed concern about the terms "feature or appliance," and suggested careful review for the use of "ESS."

This public comment includes two primary elements:

1. Restore the existing language in IFC 312 for general requirements for vehicle impact protection.

2. Restore the existing language in IFC 1207.11.7 for protection of ESS from vehicle impact, and relocate that existing language to new Section 312.4, immediately following existing language in 312 through 312.3.

The provisions presently found in IFC 1207.11.7 were developed specifically for ESS. The graphic presently found as Figure 1207.11.7.1 is titled ESS Vehicle Impact Protection, and includes depiction of various locations of ESS units within the graphic. Rather than trying to extend that language and that graphic to other "features or appliances," this public comment preserves the original content and simply moves it to a new Section 312.4. This PC also restores the original language of Sections 312.1 through 312.3.

We believe these requirements can coexist in Chapter 3 as separate requirements, without disrupting other chapters of the IFC that refer back to Section 312 for vehicle impact protection.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Vehicle impact protection for ESS relocated from IFC 1207.11.7 to IFC 312.4. No changes to technical requirements.

F48-24

IFC: 316.7 (New), 316.7.1 (New), 316.7.2 (New), 316.7.2.1 (New), 316.7.2.2 (New), 316.7.3 (New)

Proposed Change as Submitted

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association

2024 International Fire Code

Add new text as follows:

316.7 Electrified fences. Electrified fences for securing commercial and industrial property shall meet the requirements of Sections 316.7.1 to 316.7.3.

316.7.1 Power requirements. The fence shall be powered by an electrical energizer with both of the following output characteristics:

1. The impulse repetition rate does not exceed 1 hertz (hz).
2. The impulse duration does not exceed 10 milliseconds, or $^{10}/_{10000}$ of a second.

316.7.2 Signage. The fence shall be identified by prominently placed and legible warning signs.

316.7.2.1 Placement. The warning signs shall be placed at each gate and access point, and on both sides of the fence, at intervals along the fence not exceeding 30 feet.

316.7.2.2 Marking. The warning signs shall be marked with a written warning or a commonly recognized symbol for shock, a written warning or a commonly recognized symbol to warn people with pacemakers, and a written warning or commonly recognized symbol about the danger of touching the fence in wet conditions.

316.7.3 System shut off switch. An approved shut off switch shall be installed allowing controlled access to the electrified fence system for the fire department to shut of power. The shut off switch shall be readily marked.

Reason: Electrified fences have been used for a very long time but have seen an increase for protecting commercial and warehouse properties from theft. Often, these fences are not marked or identified and pose a hazard to firefighters responding to emergencies. This section is provided to bring requirements for electrified fences, including electrical charge and pulse rate, signage and emergency shut of by firefighters to the Fire Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements are only applicable if an electrified fence system is being installed, there is no additional cost to comply with the proposed sections. The requirements coincide with electrified fence requirements in the California Civil Code, and are considered an industry standard.

F48-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Concerns with just some of the vagueness in some of the language. For example, there are legible warning signs required elsewhere in the code that have some significant details about what constitutes legible and the required size. There is a reference in the marking section about a recognized symbol that would be nice to see what that symbol is as part of the reason statement to have consistency about what would be considered a recognized sign. Also, the requirement for the fire department shut off switch to be readily marked needs more details such as how it is marked and where it is located, if it's a large fence, if there is more than one shut off, maybe at every entrance that the emergency services may use. (Vote: 9-4)

F48-24

Individual Consideration Agenda

Comment 1:

IFC: 316.7, 316.7.1, 316.7.2, 316.7.2.1, 316.7.2.2, 316.7.3

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

316.7 Electrified fences. Electrified fences for securing commercial and industrial property shall meet the requirements of Sections 316.7.1 to 316.7.3.

Exception: This section does not apply to agricultural occupancies and operations.

316.7.1 Power requirements. The fence shall be powered by an electrical energizer with both of the following output characteristics:

1. The impulse repetition rate does not exceed 1 hertz (hz).
2. The impulse duration does not exceed 10 milliseconds, or $^{10}/_{10000}$ of a second.

316.7.2 Signage. The fence shall be identified by prominently placed and legible warning signs.

316.7.2.1 Placement. The warning signs shall be placed at each gate and access point, and on both sides of the fence, at intervals along the fence not exceeding 30 feet.

Revise as follows:

316.7.2.2 Marking. The warning signs shall state "WARNING ELECTRIFIED FENCE" and contain the international symbol for shock hazard. Warning signs shall be reflective with a minimum 2-inch letter height, minimum stroke of 1/2 inch and with a contrasting background. ~~be marked with a written warning or a commonly recognized symbol for shock, a written warning or a commonly recognized symbol to warn people with pacemakers, and a written warning or commonly recognized symbol about the danger of touching the fence in wet conditions.~~

316.7.3 System shut off switch. An approved shut off switch shall be installed at all fire department access points, allowing controlled access to the electrified fence system for the fire department to shut of power. The shut off switch shall be readily marked.

Reason: During the 1st Committee Action Hearing in Orlando, Committee members provided comments about the requirement being applicable to agricultural occupancies, the warning sign is not descriptive enough, and there needs to be a system shut off switch at all fire department access points. The revised proposal incorporates the Committee's comments.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes clarify the sign requirements and where the fire department shut off switches are to be located. These are new requirements, only a clarification to requirements in the initial proposal.

Comment (CAH2)# 178

F53-24

IFC: 320.4.3, 320.4.3.1 (New), 320.4.3.1, 320.4.3.2, 320.4.3.3, 320.4.3.5 (New), 320.4.3.6 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

320.4.3 Outdoor storage. Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections 320.4.3.1 through ~~320.4.3.3~~ 320.4.3.6.

Add new text as follows:

320.4.3.1 Technical opinion and report. A technical opinion and report complying with Section 104.8.2 shall be prepared to evaluate the fire and explosion risks associated with outdoor storage of lithium ion and lithium metal batteries and to make recommendations for fire and explosion protection. The report shall be submitted to the fire code official and shall require the fire code official's approval. In addition to the requirements of Section 104.2.2, the technical opinion and report shall evaluate all of the following:

1. Compliance with this section.
2. Firefighting access and water supply for emergencies involving outdoor battery storage.
3. Outdoor battery fire and explosion hazards
4. Hazards involving flying debris during fire incidents igniting adjacent storage areas, buildings, or other exposure hazards.
5. Handling, storage and monitoring of damaged batteries and post-fire monitoring.

Revise as follows:

~~**320.4.3.1**~~ **320.4.3.2 Distance from storage to exposures.** Outdoor storage of lithium-ion or lithium metal batteries~~, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*,~~ shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where batteries are contained in *approved,* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.
4. A maximum of 15 cubic feet of lithium-ion or lithium metal batteries or cells packaged in accordance with DOTn shipping requirements where not less than 3 feet (914 mm) from any building with non-combustible exterior walls, lot line, public street, public alley, public way or means of egress.

~~**320.4.3.2**~~ **320.4.3.3 Storage area size limits and separation.** Outdoor storage areas for lithium-ion or lithium metal batteries~~, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*,~~ shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than ~~10 feet (3048 mm)~~ 20 feet (6096 mm) of open space.

~~320.4.3.3~~ **320.4.3.4 Fire detection.** Outdoor storage areas for lithium-ion or lithium metal batteries exceeding 900 sq. ft. (371 m^2), regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

Add new text as follows:

320.4.3.5 Containers. Containers for outdoor storage of used or waste batteries shall be open-top and constructed of noncombustible materials; containers complying with DOTn regulations for lithium-ion and lithium metal transportation or shall be approved for battery collection and storage.

320.4.3.6 Weather protection. Where weather protection is provided for sheltering outdoor lithium ion or lithium metal battery storage or use areas, such areas shall be considered outdoor storage or use where the weather protection structure complies with all of the following:

1. Walls shall not obstruct more than one side or more than 25 percent of the perimeter of the storage area.
2. The overhead structure shall be of approved noncombustible construction with a maximum area of 3,600 square feet (334.5 m2).
3. The distance from the structure to buildings, lot lines, public ways or means of egress to a public way shall be not less than the distance required for an outside storage in Section 320.4.3.2.
4. Weather protection structures used for sheltering lithium ion or lithium metal battery storage shall be separated from lithium ion or lithium metal battery piles or additional weather protection structures used to shelter lithium ion or lithium metal battery storage by no less than 20 feet (4572mm).
5. The height of battery storage in such areas shall not exceed 10 feet (3048 mm).

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal accomplishes the following:

320.4.3.1 removed reference to IBC Weather protection which only applies to hazardous materials, currently we don't treat this battery storage as hazardous materials, but we were pointing to a hazardous material provision for the weather protection. Added 320.4.3.6 to provide weather protection specific to battery storage which is consistent with the requirements of NFPA 855.

320.4.3.1 #4: provides some relief by adding a provision for limited storage for waste batteries as they are collected/packaged for offsite shipping (typically in 55-gallon drums) with batteries in bags to prevent short circuiting, and space between filled with vermiculite. This is common practice and allows for waste pack containers to be outside vs inside, which is generally a much safer option. The quantity limit is still limited to 15 cf consistent with indoor storage allowance. See https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2021-09/Lithium-Battery-Guide.pdf

320.4.3.2 eliminates the reference to IBC weather protection, it is now addressed directly in its own section.

320.4.3.4 Adds a size threshold for fire detection, which can be complicated and expensive for outdoor design and maintenance. Increases consistency with NFPA 855.

320.4.3.5 Adds a container section for outdoor storage which prescribes allowable container types. .

320.4.3.5 Adds the weather protection requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The provisions of this revised section are focused upon outdoor storage and generally do not affect construction costs. This proposal increases storage options at locations where lithium-ion or lithium metal batteries are being stored outside, though the required technical report could present additional cost for locations that only have outdoor storage, (the report is currently necessary for any indoor storage over 15 cu. ft.), the permit costs are what are potentially increased in the short term, but overall costs are reduced in the long term by providing for an increase in storage options, increased weather protection structure size and allowance for small quantities in DOT shipping containers.

The justification is that by providing for recognition of approved DOT shipping container use and increasing the permissible size of the weather enclosure the over costs to a site storing batteries outside are reduced. Increasing storage options provides for cost containment. Requiring the technical report upfront identifies hazards and mitigation methods for those hazards, reducing long term operational costs for the facility and the emergency responders.

F53-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for the approval of the proposal were: It addresses some important gaps and provides guidance about the technical report. Specifically, it evaluates the hazards on a site-specific basis, picking up the weather protection requirements, which are gaps in the codes right now. (Vote: 12-2)

F53-24

Individual Consideration Agenda

Comment 1:

IFC: 320.4.3.3, 320.4.3.4

Proponents: Abid Anwar, Tesla (aanwar@tesla.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

320.4.3.3 Storage area size limits and separation. Outdoor storage areas for lithium-ion or lithium metal batteries shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 20 feet (6096 mm) of open space. **Exception:** Where approved by the fire code official, smaller separation distances shall be permitted based on findings in the technical opinion report in compliance with Section

320.4.3.1

320.4.3.4 Fire detection. Outdoor storage areas for lithium-ion or lithium metal batteries exceeding 900 sq. ft. (371 m^2), regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection. **Exception:** Where approved by the fire code official, fire detection and alarm systems are permitted to be omitted based on the findings in the technical opinion report in compliance with Section 320.4.3.1.

Reason: F53-24 was Approved As Modified by Committee with the expectation to see a technical justification or risk basis where the proposed code changes do not correlate with NFPA 855. Tesla is committed to helping fire departments and first responders safely handle emergency situations involving all Tesla products. We have trained thousands of first responders to appropriately handle Tesla products and batteries through virtual and in-person training, through provision of decommissioned vehicles, support lines, and attendance at relevant safety and code conferences. Tesla understands the intent of the proposal in keeping first responders and the public safe, as such, Tesla proposes utilization of the technical opinion report to allow a performance-based pathway to omit and/or modify prescriptive code requirements where the site-specific risk analysis supports such actions.

This public comment retains the technical opinion report and increased prescriptive separation distances between storage areas while providing a means to:

1. reduce storage area separation distances based on the technical opinion report and accompanying site specific risk analysis as required per 320.4.3.1.
2. omit fire detection requirements based on the technical opinion report and accompanying site specific risk analysis as required per 320.4.3.1

The utilization of the technical opinion report to deviate from prescriptive code requirements through a rigorous risk and mitigation analysis is consistent with current use cases for technical opinion reports. The proposed code language provides the fire code official ultimate authority to accept the findings of the technical opinion report using the "where approved" charging language. No technical justification or substantiation was provided for the increase in battery array spacing from 10 ft. to 20 ft., however, this proposal allows for increased conservative prescriptive requirements with an avenue for performance and risk-based reductions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

the modification proposed by AMC#2 does not affect the cost of construction as it relates to separation requirements pertaining to outdoor storage of lithium and lithium-ion batteries.

Comment (CAH2)# 549

F56-24

IFC: SECTION 322 (New), 322.1 (New), 322.2 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

SECTION 322
NONCOMBUSTIBLE MATERIALS

322.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the *International Building Code*.

322.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material. The IBC includes in Chapter 7 added details on testing building materials to ASTM E136. Section 703.3.1 of the IBC includes also an exception that clarifies that some materials are acceptable for use as noncombustible materials irrespective of whether they "pass" ASTM E136.

There are definitions contained in the 2024 IMC and 2024 IFGC, and in the 2021 IPC, but they are actually more of a requirement than a definition.

In the area of material regulation, materials that pass ASTM E136 have long been considered in the US to be those that are noncombustible materials, and that concept is consistent with what IBC section 703.3 states.

The requirement for what constitutes a noncombustible material should be placed in a general requirement section, in Chapter 3.

If no requirement (or a definition containing a requirement) exists experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often a confusion in the public mind when considering a material that performs better than typical combustible materials, but should not be considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested (for example to ASTM E136).

The language in section 703.3.1 of the IBC reads as follows:

> ***703.3.1 Noncombustible materials.*** *Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.*
>
> ***Exception:*** *Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm)*

in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal adds a definition, which is consistent with long-held understanding of what is a noncombustible material.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply adds a clarification that is consistent with the existing requirement in the IBC.

F56-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval were: Based on the many floor modifications discussed it is definitely not ready. The testing section in Section 322.1 that puts in a pointer really appears to be just a solution in search of a problem and there is no value in solving the problem. Opposition to the laundry list of things that would be considered noncombustible. It will result in many unintended consequences. There are a lot of places where noncombustible is used and it just does not address all of those in the reason statement. (Vote: 13-0)

F56-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 322, 322.1, 322.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 322
NONCOMBUSTIBLE <u>BUILDING</u> MATERIALS

322.1 Testing. Noncombustible <u>building</u> materials shall be those materials that comply with Section 703.3.1 of the *International Building*

Code.

Revise as follows:

322.2 ~~Inherently noncombustible materials~~ Testing Not Required. ~~Inherently noncombustible materials, such as concrete and steel,~~ The following building materials shall not be required to be tested to be acceptable as noncombustible building materials.

1. Steel,
2. Concrete, containing no combustible aggregates or fibers,
3. Masonry, containing no combustible aggregates or fibers,
4. Glass (excluding plastic glazing),
5. 5xxx and 6xxx series aluminum alloys.

Reason: Several materials can claim to be inherently noncombustible, in many cases without it being truly valid. For example, any plastic or wood materials are always combustible. This issue is an important consideration for building materials (see for example chapter 8 of the IFC where requirements are different depending on whether the materials are or are not noncombustible.

Some materials exist (often insulation materials) where it is not possible to determine without testing (normally to ASTM E136, as required in the IBC) whether they are truly noncombustible. For example, fiberglass insulation materials will always contain some combustible binder to be useful. The material can pass the ASTM E136 test (and be noncombustible) if it contains a small amount of binder but fail the test with larger amount of binder. That can only be determined by testing and is impossible to note visually.

It makes no sense to test steel, concrete or masonry (if they contain no combustible aggregates or fibers, which would have to be certified by the proponent0. Therefore, as it has been shown by testing (and common sense) that testing steel, concrete or masonry to ASTM E136 is unnecessary, as they will pass the test they can be excluded from being required to be tested.

However, some new building materials are made with organic (such as foam plastics) components to lower the weight and make them easier to manipulate. In that case, it is unclear whether they are truly noncombustible materials, and they would need to be tested to know the answer for sure. That is why the requirement has been added that they contain no combustible aggregates or fibers.

Test results from at least two testing labs have been able to show that glass (whether ordinary glass or quartz) truly meets the requirements of ASTM E136 and is a noncombustible material. The same is not true for other glazing materials, which are typically plastic and are combustible; they must be excluded.

That brings up the question of aluminum. Typical building materials are, more often than not, alloys of aluminum and other metals. The Aluminum Association has published a report in Building Safety Journal (August 17th, 2020) where they discuss the “noncombustibility” of aluminum. It is of great interest that the 4 aluminum alloys that they tested “were selected for their widespread use in construction”. Those alloys tested all passed the ASTM E136 test. However, the same report also states that “Aluminum, just like many comparable metals, is not combustible in any general application other than when it is specifically made to be.” That suggests that there may be some aluminum alloys that may or may not be noncombustible. After considerable debate and investigation of test reports, consensus was reached that most of the aluminum alloys used as building materials belong to the 6xxx series of alloys, with less than 1.2% magnesium, and the main ones (such as 6063, 6061, 6005) have all been tested for noncombustibility. In terms of sheet aluminum products, the series 5xxx alloys (such as 5052, 5083, 5005) are often used in construction, with higher levels if magnesium (the highest being 5083, which contains 4.9% magnesium). This product has also been tested and shown to be noncombustible. Therefore, consensus was reached that it is safe to include “5xxx and 6xxx series aluminum alloys” to the list of building materials that do not require testing to be considered noncombustible materials.

The task group that developed this comment included representatives from a variety of industries, including: steel, aluminum, concrete, masonry, glass, wood, and plastics.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as

interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will clarify that a number of materials are clearly noncombustible and will not require additional fire testing. If anything, this comment will decrease costs because less testing for non combustibility will be needed.

Comment (CAH2)# 105

F58-24

IFC: SECTION 202, SECTION 202 (New), 105.5, 105.5.5 (New), SECTION 322, 322.1, 322.1.1, 322.1.1 (New), 322.2, 322.1.3 (New), 322.1.4 (New), 322.1.5 (New), 322.1.5.1 (New), 322.2 (New), 322.2.1 (New), 322.2.2 (New), 322.2.2.1 (New), 322.2.2.2 (New), 322.2.2.3 (New), 322.2.2.4 (New), 322.2.2.5 (New), 322.2.2.6 (New), 322.2.2.7 (New), 322.2.2.8 (New), 322.3 (New), 322.4, 322.4 (New), 322.5, 322.3, 322.6.1 (New), 322.6.2 (New), 322.6.3 (New), 322.6.4 (New), 322.7 (New), TABLE 903.2.11.6, UL Chapter 80 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

BATTERY-POWERED MICROMOBILITY DEVICES. Products or equipment that include Motorized bicycles, motorized scooters and other personal mobility devices intended for one or more riders powered by a lithium-ion or lithium metal battery. The term does not include automobiles and trucks built to DOT requirements. ~~motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction~~

Add new definition as follows:

BATTERY-POWERED APPLIANCE. A device or apparatus with an electric motor powered by a battery.

BATTERY-POWERED INDUSTRIAL EQUIPMENT. A motorized hand truck, floor scrubber or buffer or similar device with an electric motor intended to be personally driven or guided, powered by a battery.

BATTERY-POWERED INDUSTRIAL TRUCK. A forklift, tractor, platform lift truck or similar apparatus with an electric motor powered by a battery.

BATTERY-POWERED AUTOMATED MOBILE PLATFORMS (AMPs). A device with an electric motor powered by a battery that provides an automated function involving lifting, carrying, product picking, towing, and similar operations. These devices may also be capable of automatous movement including operating, moving and completing automated functions independently, without direct human guidance or control.

BATTERY POWERED ROBOTIC EQUIPMENT. A machine or device with an electric motor powered by a battery capable of automatically carrying out a complex series of actions using computer programing. This equipment may be permanently mounted or capable of autonomous movement where they have the means to determine path selection by processing data from sensors, powered by a battery.

Revise as follows:

105.5 Required operational permits. The *fire code official* is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through ~~105.5.54~~ 105.5.58.

Add new text as follows:

105.5.5 Battery powered devices, trucks, equipment and appliances. An operational permit is required for the use of a battery powered device, truck, equipment or appliance with a battery capacity greater than 300 Whs.

Revise as follows:

SECTION 322
BATTERY-POWERED ~~MICROMOBILITY~~ DEVICES, TRUCKS, EQUIPMENT

AND APPLIANCES

322.1 General. ~~Lithium ion and lithium metal~~ *Battery-powered micromobility devices, battery-powered industrial trucks, battery-powered industrial equipment, battery-powered robotic equipment and battery-powered appliances* shall be operated and maintained in accordance with this section. **Exceptions:**

1. Batteries with a capacity less than 300 Whs.

~~1.~~ 2. Storage, ~~repair~~ and use ~~charging in residential occupancies~~ of powered mobility devices, in Group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than Group R-4, Condition 2 Occupancies, provided that such devices are for personal use by its owner. The charging location shall not obstruct the means of egress.

~~2. Charging of a single powered mobility device in any occupancy by its owner.~~

Delete without substitution:

~~**322.1.1 Prohibited locations.** The use of a residential occupancy as a business for the charging of commercially owned *powered micromobility devices* as part of a rental or sales service shall not be permitted.~~

Add new text as follows:

322.1.1 Operational permit. An operational permit shall be obtained from the *fire code official* in accordance with Section 105.5 for the use and battery charging operations regulated by this Section.

Revise as follows:

~~**322.2**~~ **322.1.2 Battery charging operations ~~chargers and equipment~~.** ~~*Powered micromobility devices* shall be charged~~ Battery charging operations shall be in accordance with their device listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

Add new text as follows:

322.1.3 Ventilation. Mechanical exhaust ventilation to the exterior shall be provided at the source in the charging location in accordance with *the International Mechanical Code*Chapter 5 to prevent the dangerous accumulation of any flammable or other hazardous gases that are produced or discharged by the battery during normal charging operation.

322.1.4 Spill control and neutralization. Approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.2.
2. For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

322.1.5 Battery charging locations. Charging of any battery powered industrial equipment, battery powered industrial truck, battery powered robotic equipment or battery-powered appliance in any occupancy shall be in an approved outdoor location or in an indoor area that complies with Section 322.2.

322.1.5.1 Prohibited locations. Repair or charging operations for business purposes shall not be permitted in the following locations:

1. In a detached one- and two-family dwelling or townhouse occupied under the International Residential Code or R2, R3, or R4 Occupancies
2. In sleeping rooms or means of egress paths of R-1 Occupancies.

322.2 Requirements for indoor charging locations. Indoor charging operations shall be provided with fire detection, fire suppression and other hazard mitigation measures as required by this Section.

322.2.1 Charging requirements for lead-acid batteries. Indoor charging areas for lead-acid batteries shall comply with Section 322.1 and 322.2.2.8

322.2.2 Charging requirements for lithium-ion and lithium metal batteries. Indoor charging areas for lithium-ion and lithium metal batteries shall comply with Section 322.1 and 322.2.2.1 through 322.2.2.8

322.2.2.1 Fire suppression. The *fire area* containing the indoor charging location shall be protected by an *automatic sprinkler system* installed in accordance with Section 903.3.

322.2.2.2 Fire detection. The indoor charging location shall be protected by a fire alarm system utilizing a smoke detection system, thermal imaging system or radiant energy-sensing fire detection system

322.2.2.3 Electrical recepticles. The indoor charging location shall be provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle installed in accordance with NFPA 70. The use of extension cords or relocatable power taps shall not be permitted.

322.2.2.4 Prohibited storage. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted in the indoor charging location.

322.2.2.5 Means of egress. The charging operation shall not be conducted in or obstruct any required means of egress.

322.2.2.6 Storage enclosure. Removable batteries shall not be stacked or stored in an enclosed cabinet unless the cabinet is *listed* or is a specially designed battery containment enclosure *approved* for such purpose.

322.2.2.7 Battery charging seperation. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material or is within a specially designed rack or cabinet designed and *approved* for such purpose.

322.2.2.8 Device charging seperation. A minimum of 18 inches (457.2 mm) shall be maintained between the locations of the batteries on each powered micromobility device, industrial truck, equipment, robot or appliance during charging operations.

322.3 Repairs. Repairs of *battery-powered micromobility devices*, *battery-powered industrial trucks*, *battery-powered industrial equipment*, *battery-powered appliances* and *battery-powered robotic equipment* shall be performed in *approved* locations outside of buildings or within buildings in areas specifically *approved* for that purpose.

Delete without substitution:

~~**322.4 Battery charging areas.** Where *approved*, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:~~

1. ~~Only *listed* devices utilizing *listed* charging equipment shall be permitted to be charged.~~

2. ~~Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.~~
3. ~~Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.~~
4. ~~The charging operation shall not be conducted in or obstruct any required means of egress.~~
5. ~~Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and *approved* for such purpose.~~
6. ~~A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material.~~
7. ~~A minimum of 18 inches (457.2 mm) shall be maintained between the location of the battery on each *powered micromobility device* during charging operations.~~
8. ~~The indoor room or area shall be protected by a *fire alarm system* utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.~~

Add new text as follows:

322.4 Replacement batteries and chargers. Replacement batteries and chargers shall be the equipment manufacturer supplied or the replacement battery or charger shall be in compliance with the manufacturer's instructions for the certified equipment or device.

Revise as follows:

322.5 Fire safety plan. A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

~~**322.3**~~ **322.6 Listing.** ~~*Powered micromobility devices*~~ Battery powered equipment shall be *listed* and *labeled* in accordance with this Section where applicable and shall be operated and charged in accordance with its listing and the manufacturers instructions. ~~with UL 2272 or UL 2849, as applicable.~~

Add new text as follows:

322.6.1 Battery-powered micromobility devices. Battery-powered micromobility devices shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.6.2 Battery-powered Automated mobile platforms (AMPs). Battery-powered Automated mobile platforms (AMPs) shall be listed and labeled in accordance with UL 3100.

322.6.3 Battery-powered Robotic equipment. Battery-powered robotic equipment shall be *listed* and *labeled* in accordance with UL 3300.

322.6.4 Portable battery-powered equipment and appliances. Where installed or used, portable battery-powered equipment and appliances shall be *listed* and *labeled* in accordance with UL 2595 or the applicable standard for its use.

322.7 Hazardous (classified) locations. Battery powered micromobility devices, trucks, equipment, appliances and battery powered tools operated in in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be *listed* and *labeled* or approved for use in the environment intended.

Revise as follows:

TABLE 903.2.11.6 ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS

SECTION	SUBJECT
320.2	Lithium-ion and lithium metal battery storage
322.2.2.1	Lithium-ion and lithium metal battery charging locations
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement area
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.5	Pyroxylin plastic storage in existing buildings
1103.5.2	Existing Group I-2 occupancies
1103.5.3	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1206.9, Table 1206.10, Table 1207.7, Table 1207.8	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.4	Spray finishing in Group A, E, I or R
2404.6	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM workstation exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms
5003.8.5.3	Exhausted enclosures
5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing

For SI: 1 cubic foot = 0.023 m^3.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

3100-2021	Automated Mobile Platforms
3300-2020	Outline of Investigation for Service, Communication, Information, Education and Entertainment Robots
2595-2015	General Requirements for Battery-Powered Appliances

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

This proposal does several things.

The proposal consolidates all the requirements for battery powered *micromobility devices*, *industrial trucks*, *industrial equipment*, *robotic equipment* and *appliances* into this section.

Definitions are added for guidance on what types of devices, trucks, equipment and appliances are intended to be regulated.

Where a code requirement is specifying the “use” of a battery powered device, “use” is intended to be all operations relating to the device, including battery charging operations.

Further to the definition for BATTERY POWERED ROBOTIC EQUIPMENT, the automated functions of a battery-powered automated mobile platform (AMPs) may be provided by a gripping, suction attachment, scope or similar attachment to lift or carry the load, powered by a battery.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The building and fire code already have triggers in current editions for fire suppression and detection, so there are no increases in construction cost associated with this proposal.

The proposal does impose operational requirements based on the storage, use, repair and/or charging of battery powered devices and equipment, but those requirements do not impose or increase construction cost.

F58-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was based on the proponent’s reason statement and specifically that it provides clarity for the requirements that are being relocated into one section. (Vote: 7-6)

Individual Consideration Agenda

Comment 1:

IFC: 322.1

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

322.1 General. *Battery-powered micromobility devices, battery-powered industrial trucks, battery-powered industrial equipment, battery-powered robotic equipment and battery-powered appliances* shall be operated and maintained in accordance with this section. **Exceptions:**

1. Batteries with a capacity less than ~~300~~ 200 Whs.
2. Storage, and use of powered mobility devices, in Group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than Group R-4, Condition 2 Occupancies, provided that such devices are for personal use by its owner. The charging location shall not obstruct the means of egress.

Reason: This proposal drops the size of the battery exception down to 200-watt hours. Personal mobility fleets can have batteries with between 200- and 300-watt hours. The 300-watt hours carve out would have eliminated regulating commercial fleets currently in existance.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The building and fire code already have triggers in current editions for fire suppression and detection, so there are no increases in construction cost associated with this proposal.

The proposal does impose operational requirements based on the storage, use, repair and/or charging of battery powered devices and equipment, but those requirements do not impose or increase construction cost.

Comment (CAH2)# 711

Comment 2:

IFC: 105.5.5, 322.1

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

105.5.5 Battery powered devices, trucks, equipment and appliances. An operational permit is required for the use of ~~a~~ battery powered devices and equipment as required by Section 322. ~~truck, equipment or appliance with a battery capacity greater than 300 Whs.~~

322.1 General. *Battery-powered micromobility devices, battery-powered industrial trucks, battery-powered industrial equipment, battery-powered robotic equipment and battery-powered appliances* shall be operated, ~~and~~ maintained, charged and repaired in accordance with this section. **Exceptions:**

1. Batteries with a capacity less than 300 Whs.
2. Storage, and use of powered mobility devices, in Group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than Group R-4, Condition 2 Occupancies, provided that such devices are for personal use by its owner. The charging location shall not obstruct the means of egress.

Reason: This more closely aligns the permit requirements with the devices and equipment regulated by Section 322, and covers not only use it also clarifies that section 322 also covers charging and repair operations. Additionally the 300 Wh minimum threshold is removed from 105.5.5 because it will be addressed within section 322.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides further clarification and a pointer to Section 322 so the addition of the language in this proposal results in no additional cost.

Comment (CAH2)# 682

Comment 3:

IFC: SECTION 322, 322.1

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

SECTION 322
BATTERY-POWERED DEVICES AND EQUIPMENT, ~~TRUCKS, EQUIPMENT AND APPLIANCES~~

322.1 General. The following b~~B~~attery-powered ~~*micromobility*~~devices and~~, *battery-powered industrial trucks, battery-powered industrial* equipment, *battery-powered robotic equipment and battery-powered appliances*~~ shall be operated and maintained in accordance with this section.

1. *Battery powered appliances*
2. *Battery powered automated mobile platforms*
3 *Battery powered industrial equipment*
4 *Battery powered industrial trucks*
5 *Battery powered micromobility devices*
6 *Battery powered robotic equipment*

Exceptions:

1. Equipment and devices with bBatteries with a capacity less than 300 Whs.
2. Storage, and use of powered mobility devices, in Group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than Group R-4, Condition 2 Occupancies, provided that such devices are for personal use by its owner. The charging location shall not obstruct the means of egress.

Reason: Reason: This proposal simplifies the title of this section so it doesn't include a long laundry list of products covered. The term "battery powered devices and equipment" adequately covers all of the products covered by this section.
322.1 is revised to move the items in the charging sentence into a numbered list for ease of reference. In addition item 2 - Battery powered automated mobile platforms is added to this section since it is covered by 322.6.2 of the original proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is only a format change to the existing language, so there is no cost associated with this change.

Comment (CAH2)# 721

Comment 4:

Proponents: Abid Anwar, Tesla (aanwar@tesla.com) requests Disapproved

Reason: F58-24 was Approved by Committee with the acknowledgement that additional work is required prior to the second CAH to address concerns in the proposal. From the proposal and testimony, it was indicated that the proposal does not introduce new requirements rather consolidates existing requirements into an updated section 322 with expanded scope. Research on this topic indicates that F58-24 could impact millions of regulated occupancies and even more unique pieces of battery operated equipment. Although the intent may not have been so expansive, as proposed, F58-24 would be the most significant and far-reaching proposal approved in CAH #1. F58-24 should be disapproved for the following non-exhaustive list of reasons:

- The updated scope of Section 322 is expansive in regulating all battery powered appliances with capacities not less than 300 watt-hours. Battery operated devices with capacities not less than 300 watt-hours can be readily purchased for a litany of commercial and residential products. The exception for powered mobility devices in group R-2 dwelling units or detached one- and two-family dwellings and townhouses, other than group R-3, Condition 2 occupancies entails significant impact to residential occupancies for non-mobility related equipment.
- Residential battery operated equipment not less than 300 watt-hours results in onerous and burdensome requirements for residential applications for devices not limited to power tools, lawncare equipment, home health medical and life saving equipment. Residential dwellings and commercial occupancies would require the construction of fire areas, installation of fire suppression systems based on a live fire testing, operational permits and fire detection equipment.
- F58-24 does not simply consolidate requirements but creates onerous new requirements not substantiated in IFC 2024 or NFPA 505. Furthermore, no technical justification or risk basis is provided to justify the orders of magnitude scope increase:

- Contrary to provided testimony, fire suppression systems would be required for structures historically exempt from fire suppression requirements. Fire suppression based on live fire testing in accordance with 903.3 results in suppression requirements for occupancies exempted from suppression requirements in 903.2
    - Fire suppression not required for industrial trucks regulated by Section 309 or personal mobility equipment. Section 320 fire suppression requirements not applicable for new or refurbished batteries installed in equipment, devise or vehicles they are designed to power. Section 1207 fire suppression requirements only triggered where lithium ion and/or lithium metal storage capacities exceeded 20 kW. Fire suppression requirements not consistent with NFPA 505.
- Fire detection systems formerly only required by Section 322 for personal mobility equipment and not currently required for all equipment captured by scope of 322.
- Operational permit requirements not required in IFC 2024. Operational permit requirements are cumbersome, overly burdensome and unclear. For example, are battery operated appliances utilizing multiple batteries with capacities not greater than 300 kWh require an operational permit for use but exempt from charging operational permit.
    - Unclear on enforceability, validity or technical justification to mandate device level operational permits.
- Fire rated rooms required per updated scope of section 322 whereas not required in section 309 or 322 in IFC 2024
    - No combustible storage in fire area exceeds article 309 requirements for no combustibles within 3 feet or 322 requirements for no combustible in rooms where charging occurs.
    - Enclosed fire rated rooms required for charging of regulated equipment to avoid ban on combustible storage in the entire occupancy
- 18" separation between devices being charged unsupported in existing codes with no technical justification provided
- Exterior charging of regulated equipment only permissible in approved locations resulting in an enforcement nightmare

- example ramifications for the healthcare industry include significant complexities and cost associated with the ability of residential occupancies to receive life-saving medical equipment where battery capacities exceed 300 watt-hours for life saving medical equipment such as portable oxygen collectors and battery operated ventilators. will insurance providers require operational permits and proof of Section 322 compliance prior to delivering regulated equipment?
- example ramifications for construction and landscaping companies would require operational permits for utilization at each specific site and approval for pre-designated outdoor charging locations. Construction equipment could not be charged at active construction sites without approval for exterior charging locations. Interior charging at occupancies under construction precluded by requirements for fire suppression, fire area and fire detection requirements.
- Sweeping scope of F58 would result in significant potential for insurance indemnification due to complexities with interior charging requirements, operational permits and requirements for approved exterior charging locations.
- No technical substantiation or risk basis provided as basis for significant new requirement development and operational permit requirements
- Cost basis information incorrectly indicates zero. F58-24 will result in significant cost expenditure for commercial and residential occupancies regulated by F58 due to fire area, fire suppression and fire detection requirements.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 552

F61-24

IFC: SECTION 202 (New), SECTION 323 (New), 323.1 (New), NFPA Chapter 80 (New)

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Daniel Carroll, New York State Department of State, Department of State (daniel.carroll@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Fire Code

Add new definition as follows:

LIVE FIRE TRAINING BUILDING. A building in which live fire training evolutions are conducted on a repetitive basis.This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers.

Add new text as follows:

SECTION 323
LIVE FIRE TRAINING BUILDINGS

323.1 Live fire training buildings. Live fire training buildings and any appurtenances connected or attached to such buildings or structures shall be designed, constructed and maintained in accordance with the applicable provisions of NFPA 1402, this code and the *International Building Code*.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

1402-2019 Standard on Facilities for Fire Training and Associated Props

Reason: Live fire training facilities contain unique types of buildings/structures that are in some instances, purposely designed to not meet building codes and/or simulate potentially hazardous conditions. NFPA 1402, when combined with the building codes of the jurisdiction, provides for the necessary design and construction provisions of these types of buildings and gives the code enforcement community the tools necessary to properly regulate them. The scope of the standard acknowledges that building codes and gas codes do not address the unique and specific requirements for these specialized types of facilities. It is not the intent of this proposal to capture buildings that are designed, constructed, and maintained to the International Building Code and International Fire Code already, such as a B or A occupancy where instruction on fire practices takes place, rather, to capture those buildings not clearly covered by the Codes that would typically require variances or modifications of code language to be compliant.

From the previous cycle, based on committee comments, the definition of “Live Fire Training Building” was modified to ensure only buildings where live fire training exercises are conducted are captured. The “associated systems, appliances and props” was also removed from the definition and the term “appurtenances” was added to the section to ensure the intent is not to capture stand-alone props that may be co-located at the same facility such as a gas-fired car prop but to capture gas-fired props used to simulate fire in or on the structure. Furthermore the requirement that the building still had to be constructed following the applicable provisions of the IBC was added.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not intended to add any new provisions on buildings. The use of NFPA1402 to design and construct these types of buildings is already a standard of practice in the industry. This proposal is simply codifying the requirement, giving the code enforcement community a means to properly implement the provisions of NFPA 1402, and squarely placing the building into a specific use group for consistency.

F61-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as requiring compliance with the IBC would be problematic. In particular the IBC would require compliance for accessibility along with typical egress features such as stairway requirements, railings and guardrails. These buildings are only built occasionally and NFPA 1400 can be applied in those instances through the alternative methods and materials section. (Vote 14-0)

F61-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

LIVE FIRE TRAINING BUILDING. A building in which live fire training evolutions are conducted on a repetitive basis, where the building is designed such that the structure is not damaged during live fire training.This shall include, but not be limited to, containerized training structures, live fire training structures, and training towers.

Reason: The proposed modification is intended to address committee concerns about acquired buildings. Many fire departments do live fire training using acquired buildings, which are typically buildings designed for other uses which have reached the end of their life and are given to the fire department for use in training. The live fire trainings conducted in such buildings damage the structure, and such structures can usually only be utilized for 2-3 training sessions. This modification clarifies that the definition of live fire training buildings is intended to apply solely to buildings designed to be utilized as such without damage to the structure during training.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification is added simply to clarify which sections of the IBC are applicable, it does not add or remove provisions.

Comment 2:

IFC: 323.1

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

323.1 Live fire training buildings. Live fire training buildings and any appurtenances connected or attached to such buildings or structures shall be ~~designed, constructed and~~ maintained in accordance with the maintenance and operational ~~applicable~~ provisions of NFPA 1402~~,~~ and this code ~~and the *International Building Code*~~.

Reason: This modification will remove the design and construction requirements from the original proposal code as requested in the 1st CAH. However, it will require a live fire training building to be inspected by a professional to ensure the buildings are safe after being subject extreme stress that is associated with the extreme temperature fluctuations.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal may increase the cost of construction or the cost may remain the same, depending on how the enforcement community has previously enforced the provisions of the code on these types of buildings. Some already enforce these additional standards, others may enforce nothing, treating these buildings as outside the scope. In the second scenario, the cost may increase in order to ensure compliance with the new standards

Estimated Immediate Cost Impact Justification (methodology and variables):

it is estimated that the cost will be less than $10,000 for the inspection performed in accordance with NFPA 1402 Section 7.2 the standard requires them to be performed at a 3 yr, 5 yr or 10 yr interval) with the typical one at a 5 yr interval.

Estimated Life Cycle Cost Impact:

it is estimateded that a live fire training build will last 25 years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

see above

F62-24

IFC: SECTION 202 (New), SECTION 323 (New), 323.1 (New), 323.2 (New), 323.3 (New), 323.4 (New), 323.5 (New), 323.5.1 (New), 323.6 (New), 323.7 (New), 323.8 (New), 323.9 (New), 323.9.1 (New), 323.9.2 (New), 323.9.3 (New), UL Chapter 80 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new definition as follows:

MODULAR ROOM. A prefabricated structure intended for indoor use to provide privacy that has walls, a ceiling, with or without an integrated floor, and that can include integral electrical wiring, ventilation, and furniture.

Add new text as follows:

SECTION 323
MODULAR ROOMS

323.1 General. *Modular rooms* shall comply with this section.

323.2 Permits. A construction permit shall be required for the installation of *modular rooms*.

323.3 Listing. *Modular rooms* shall be *listed* and *labeled* in accordance with UL 962. **Exception:** Precast concrete construction in accordance with Chapter 17 and 19 of the *International Building Code* shall not be required to be listed.

323.4 Location. *Modular rooms* shall not obstruct the means of egress and shall be installed in approved locations.

323.5 Installation. *Modular rooms* shall be installed in accordance with the listing and manufacturer's installation instructions.

323.5.1 Stacking. Modular rooms shall not be stacked.

323.6 Floor Area. The aggregate area of *modular rooms* shall not exceed 10 percent of the fire area.

323.7 Occupant Notification system. Where modular rooms are installed in areas equipped with an occupant notification system, the audible and visual signals shall provide notification to the occupants within the *modular room* in accordance with Section 907.5.

323.8 Automatic sprinkler system. Where modular rooms exceeding 24 ft2 (2.2 m2) are installed in areas protected by an automatic sprinkler system, the automatic sprinkler system shall provide protection within the *modular room* in accordance with Section 903.3.

323.9 Modular rooms used for sleeping. *Modular rooms* used for sleeping shall also comply with Sections 323.9.1 through 323.9.3.

323.9.1 Location. *Modular rooms* shall not be permitted in Group F,H,S, or U occupancy groups.

323.9.2 Number of Modular rooms used for sleeping. The *fire code official* is authorized to limit the number of *modular rooms* installed in a single fire area.

323.9.3 Smoke detection. In buildings equipped with a fire alarm system, the *modular room* shall be equipped with smoke detectors. In other buildings, the *modular room* shall be equipped with a smoke alarm in accordance with Section 907.2.11.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

962-2022 Household and Commercial Furnishings

Reason: Modular rooms are becoming increasingly popular and are showing up in a variety of different occupancies. This proposal provides a means for code officials to approve these installations and allow the use of these prefabricated furnishings. The locations where these are found include airports, convention centers, business and government buildings. These are factory-built products, rather than rooms being constructed as a part of the structure in accordance with the local building code.

Requiring the modular room to be listed to UL 962 provides the code official with verification that the modular structure met testing requirements for applicable fire and electrical shock safety for occupants.

The UL 962 listing standards covers the fabrication and safety of the modular room. UL 962 includes requirements for insulation, finish materials, internal wiring, lighting, ventilation, and other construction features. UL 962 requires that modular rooms be tested for flame spread, with minimum passing results equivalent to a UL 723 FSI of 200. UL 962 additionally contains furniture flammability requirements for upholstered seating and mattresses that may be incorporated into the modular room.

Proposed section 322.5 limits the size of a modular room to not exceed 100 ft^2 to reflect that these modular rooms are factory-built products and not conventional construction.This proposal treats modular rooms as products that can be installed in a building, and not as building construction, while not losing applicable code requirements.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Though there is cost increases with the need to comply with UL 962 and potentially adjustment to automatic sprinkers and fire alarm devices these are treated primarily as a product being placed in a building and are not associated with building construction. The cost of compliance with UL 962 will vary based upon the product being listed to this standard and how it will affect systems being used in the building.

F62-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: 2024 International Fire Code
105.6.17 Modular Rooms. A construction permit is required to install modular rooms.

323.2 Construction Permits.
A construction permit in accordance with Section 105.6.17 shall be required for the installation of *modular rooms*.

Committee Reason: The committee stated that the reason for the approval of the modification was that it cleans up the revisions to provide the necessary information for the Chapter 1 requirements. The stated reasons for the approval of the proposal with the modification were: The new section provides information for these modular rooms being used throughout the world in locations such as airports and hotels. The definition makes it clear what these things are and what is being regulated in the section and it is very appropriate to be in the IFC. (Vote: 14-0)

F62-24

Individual Consideration Agenda

Comment 1:

IFC: 323.3, 323.8, 323.8.1 (New), 323.8.2 (New), 323.8.3 (New), 323.10 (New), 323.11 (New)

Proponents: Daniel Martin, Self (dmartin@jensenhughes.com); Mati Anders Shaeffer, Self requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

323.3 Listing. *Modular rooms* shall be *listed* and *labeled* in accordance with UL 962. *Interior finishes* shall be in accordance with Chapter 8 of the *International Building Code.*

Exception: Precast concrete construction in accordance with Chapter 17 and 19 of the *International Building Code* shall not be required to be listed.

Delete and substitute as follows:

~~**323.8 Automatic sprinkler system.** Where modular rooms exceeding 24 ft2 (2.2 m2) are installed in areas protected by an automatic sprinkler system, the automatic sprinkler system shall provide protection within the *modular room* in accordance with Section 903.3.~~

323.8 Automatic sprinkler system. *Automatic sprinkler systems* for *modular rooms* shall comply with this section.

Add new text as follows:

323.8.1 Modular Rooms Not Exceeding 24ft^2 (2.2 m^2). Where permitted by the *fire code official*, *automatic sprinkler systems* shall not be required in isolated, temporarily occupied *modular rooms* that do not exceed 24ft^2 (2.2 m^2) and do not extend to the ceiling of the room or space in which the *modular room* is installed.

323.8.2 Modular Rooms Exceeding 24ft^2 (2.2 m^2). Where *modular rooms* exceeding 24ft^2 (2.2 m^2) are installed in areas protected by an *automatic sprinkler system*, the *automatic sprinkler system* shall provide protection within the *modular room* in accordance with Section 903.3.

323.8.3 Obstruction to Existing Automatic Sprinkler Systems. *Modular rooms* shall be installed such that the *modular room* does not obstruct existing *automatic sprinkler systems.*

323.10 Means of Egress from Modular Rooms. *Means of egress* from *modular rooms* shall be in accordance with Chapter 10 of the *International Building Code.*

323.11 Accessibility of Modular Rooms. Where *modular rooms* are required to be *accessible*, *accessibility* of *modular rooms* shall be in

accordance with Chapter 11 of the *International Building Code*.

Reason:
We are in general agreement with the overall goal of the proposal F62-24, but have the following comments and proposed changes.

Proposed IFC Section 323.3 (modification): While UL 962 offers an initial set of requirements for some materials, not all requirements of UL 962 correspond to associated requirements in IBC Chapter 8. This proposed change is intended to apply to any finish utilized as part of a modular room, including interior and exterior of the modular room. Below are the following reasons why reference to IBC Chapter 8 is being added.

UL 962 Section 37.3.3 and 37.3.6 requires interior finish materials with surface area greater than 10 sf to be investigated to UL 723, and when tested to UL 723, have a flame spread index of 200, and have a smoke developed index of 450 or be identified as such (Class C in accordance with IBC Chapter 8). These regulations are not consistent with IBC Section 803 requirements for flame spread index and smoke developed index based on building occupancy and automatic sprinkler system protection. Additionally, there are no size limitations for interior finish materials in IBC Section 803. UL 962 applies the 10 sf limit to individual materials, but does not address the combination of materials, each of which could be less than 10 sf but aggregately exceed the 10 sf limitation.

UL 962 Section 37.3.5 requires fabric materials without backings that are greater than 10 sf to comply with NFPA 701. IBC Chapter 8 references NFPA 701 in IBC Section 806.4 regarding fabric hangings and similar materials, which is consistent. However, there are no size limitations for fabric materials in IBC Section 806.4.

Interior finishes used for these modular rooms should be regulated in accordance with IBC Chapter 8 in addition to the listing in accordance with UL 962 so that occupants are provided with a level of safety consistent with what they would be afforded in other portions of a building.

Proposed IFC Section 323.8 (modification and addition): The proposed IFC Section 323.8 does not incorporate all requirements from NFPA 13 Section 9.2.10. The proposed change is missing the requirement for physical isolation from other modular rooms. Our proposed language is intended to be consistent with the provisions of NFPA 13 Section 9.2.10 based on area of the modular rooms.

NFPA 13 Section 9.2.10 includes provisions for sprinklers to be installed in small, temporarily occupied enclosures that do not extend to the ceiling – effectively, modular rooms. The requirement for physical isolation should be addressed in the proposed change to ensure that these modular rooms are sufficiently protected by the building's suppression system.

Additionally, installation of a modular room should not obstruct the functionality of an existing automatic sprinkler system installed within a building or space.

Proposed IFC Section 323.10 (addition): Means of egress from modular rooms was not addressed in the original proposal. Egress from modular rooms creates a hazard for occupants during an emergency. While door swings are addressed in UL 962, additional egress requirements of IBC Chapter 10, including threshold heights and door widths, should be addressed for consistency with requirements and designs found in the remainder of the building. This proposed revision provides guidance for code officials to direct installers and designers to applicable requirements.

Proposed IFC Section 323.11 (addition): Accessibility for modular rooms was not addressed in the original proposal. Though not all modular rooms are required to be accessible, similar to employee workstations or guestrooms, the proposed changes did not provide direction for accessibility requirements when applicable. This change provides guidance for code officials to direct installers and designers to applicable requirements.

Bibliography: NFPA 13 *Standard for the Installation of Sprinkler Systems* Section 9.2.10

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The potential cost impacts have already been addressed in the original proposal.

Comment (CAH2)# 265

F67-24

IFC: 403.7.3.1, 403.7.3.2, 403.7.3.3

Proposed Change as Submitted

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

403.7.3.1 Fire safety and evacuation plans. The fire safety and evacuation plans required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for evacuation of detainees with needs for containment or restraint and post-evacuation containment, where present.
2. Procedures for a *defend-in-place* strategy.
3. Procedures for a full-floor or building evacuation, where necessary.

Revise as follows:

403.7.3.2 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include both of the following in addition to the requirements of Section 404.2.2:

1. Location and number of cells.
2. Location of special locking arrangements.
3. Keys that operate doors installed in the means of egress shall be identified in the fire safety and evacuation plan.

403.7.3.3 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding 3 months. Training of new staff shall be provided promptly upon entrance to duty.

1. Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.
2. Staff shall be trained on the identification and use of keys that are necessary for unlocking doors that are installed in the means of egress.

Reason: Locked doors which require a key to operate are often found in the means of egress in I3 occupancies. The proposed change adds requirements for documentation of all such locked doors to be added to fire safety plans, ensuring that such information is easily accessible. The proposed change also adds requirements for staff training on identification and use of keys for locked doors in the means of egress, which will ensure that such doors can be opened by staff in the event of an emergency. Without proper training, staff may be unaware of the location of the keys and/or how to utilize the keys to unlock the doors, which could lead to means of egress being blocked in an emergency.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The proposed change will increase the required staff fire safety training time. We estimate a cost of roughly $10 per employee for training on operating key-locked doors in the means of egress.

Estimated Immediate Cost Impact Justification (methodology and variables):

According to a study conducted by Training Magazine (https://pubs.royle.com/publication/?m=20617&i=678873&p=24&ver=html5), companies in 2020 spent an average of $1,111 for safety training per employee, providing an average of 55.4 hours of training per employee. This provides an average cost of $20.05/hour per employee for safety training. Adding training for key-locked doors in means of egress will likely add not more than 1/2 hour of safety training per employee.

F67-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:

403.7.3.2 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include ~~both of~~ the following in addition to the requirements of Section 404.2.2:

1. Location and number of cells.
2. Location of special locking arrangements.
3. Where locked doors are permitted in the means of egress, the location of keys that operate such doors ~~installed in the means of egress~~ shall be identified in the fire safety and evacuation plan.

403.7.3.3 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding 3 months. Training of new staff shall be provided promptly upon entrance to duty.

1. Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.
2. Where locked doors are permitted in the means of egress, staff shall be trained on the identification and use of keys that are necessary for unlocking such doors ~~that are installed in the means of egress~~.

Committee Reason: The committee agreed that keys need to be identified in the fire safety and evacuation plan and should be included in staff training. The modification reflects necessary clarification that the focus is on doors that are permitted to be locked. Without this clarification it could encourage doors to be locked within the means of egress path that should not be. (Vote 12-2)

F67-24

Individual Consideration Agenda

Comment 1:

IFC: 403.7.3.2

Proponents: Jeffrey Shapiro, P.E., FSFPE, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

403.7.3.2 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include the following in addition to the requirements of Section 404.2.2:

1. Location and number of cells.
2. Location of special locking arrangements.
3. ~~Where locked doors are permitted in the means of egress, the location~~ Location of keys that operate any locked doors that have been permitted in the means of egress. ~~such doors shall be identified in the fire safety and evacuation plan.~~

Reason: As approved, the added text in Item 3 is not congruent with the formatting of the previous two items. The revisions are intended to be editorial to improve flow and clarity.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Restructures existing text.

Comment (CAH2)# 796

F70-24

IFC: 404.2.3.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

404.2.3.1 Lockdown plan contents. Lockdown plans shall include the following:

1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
4. Means and methods of initiating a lockdown plan for each threat, including:
   4.1. Occupant notification shall be based on a mass notification risk analysis conducted in accordance with NFPA 72, and the notification signal for a lockdown event ~~The means of notifying occupants of a lockdown event, which~~ shall be distinct from the fire alarm signal.
   4.2. Identification of each door or other access point that will be secured.
   4.3. A description of the means or methods used to secure doors and other access points.
   4.4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.
5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the *means of egress* has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.

Reason: This is the second of two proposals relating to notifying occupants during a lockdown. This proposal seeks to amend the means of notifying occupants during a lockdown by requiring a mass notification risk analysis to be performed. The proposal is needed because Chapter 4 the 2021 code requires a notification method distinct from the fire alarm system notification signal but provides no guidance as to the expectation for what kind of system.

A key aspect of a lockdown plan is to identify the organizational structure in charge of making decisions during a lockdown. It is critical to understand who is authorized to initiate and lift a lockdown order. There is often a need for different lockdown plans to address differing threats. Therefore, different types of messaging are required to notify occupants of different threats. For example, the correct procedure during a chemical release incident will be different from the correct procedure during an active shooter incident.

Mass notification often utilizes one or several communication technologies and is intended to communicate information about emergencies including but not limited to fire, human caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters. A lockdown situation often requires a subsequent evacuation depending on the threat, and therefore is a reasonable trigger to perform a mass notification risk analysis.

This proposal **does not automatically** mandate the installation of any mass notification systems. Rather, it only requires a risk analysis be conducted for a building that chooses to utilize lockdown plans as detailed in section 404.

Requiring a risk analysis will result in a more comprehensive emergency response plan that is customized for the specific hazards and risks associated with the building. The risk analysis and emergency response plan can be as elaborate or as basic as the fire code official and building owner determines it needs to be. This proposal only emphasizes the need to document how communicating with the occupants of the building and possibly occupants that are outside the building will be accomplished.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

There is no increase in construction cost because this proposal is not associated with construction, nor is this proposal requiring any new occupant notification system.

There will be some additional costs to conduct the risk analysis, which will be based on the complexity of the facility. For the purposes of this requirement, the scope of the risk analysis is limited to the scope of the emergency response plan being considered for a lockdown event. In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks, and strategies to mitigate those risks.

F70-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as there were coordination issues that need to be resolved with industry. (Vote 13-0)

F70-24

Individual Consideration Agenda

Comment 1:

IFC: 404.2.3.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

404.2.3.1 Lockdown plan contents. Lockdown plans shall include the following:

1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
4. Means and methods of initiating a lockdown plan for each threat, including:
   4.1.The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.
   4.2.Identification of each door or other access point that will be secured.

   4.3.A description of the means or methods used to secure doors and other access points.

   4.4.A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.

5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the *means of egress* has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.
12. Where a mass notification risk analysis has been developed in accordance with Section 917.1, the occupant notification and instructions to be provided in the event of a mass notification event.

Reason: FCAC has worked with industry to resolve issues with the original proposal (F70-24). It is worth noting that since a lockdown response could impact an ongoing or subsequent fire alarm response, it is imperative that an MNS Risk Analysis be performed to consider the potential of two alarm conditions with conflicting emergency responses. Instead of revising the list in 404.2.3.1 #4 as proposed by F70-24, this public comment moves the new reference to MNS risk analysis to a new item in the contents of a lockdown plan; item 12. It references the mass notification risk analysis, where one was developed, by focusing on the occupant notification and instructions to be provided. In doing so, it provides the user guidance about the methods of occupant lockdown notification, by pointing them to the requirements of 917.1, the risk assessment, and by increasing the visibility of 917's related requirements.
FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

There is no increase in construction cost because this proposal is not associated with construction, nor is this proposal requiring any new occupant notification system.

There will be some additional costs to conduct the risk analysis, which will be based on the complexity of the facility. For the purposes of this requirement, the scope of the risk analysis is limited to the scope of the emergency response plan being considered for a lockdown event. In extreme cases, the risk analysis may cost thousands of dollars to produce an expansive report of risks, and strategies to mitigate those risks.

Comment (CAH2)# 322

F72-24

IFC: 503.2.2, 503.2.1.1 (New), 503.2.1.2 (New), 503.2.1.2.1 (New), Table 503.2.1.2.1 (New), 503.2.1.2.2 (New), TABLE 503.2.1.2.2 (New), 503.2.1.2.3 (New), TABLE 503.2.1.2.3 (New), 503.4.1 (New), TABLE 503.4.1 (New), 503.4.2 (New), SECTION D102 (New), D102.1 (New), SECTION 202 (New), SECTION D103, D103.1, FIGURE D103.1, D103.1.1 (New), D103.2, D103.3, D103.4 (New), TABLE D103.4, D103.5, D103.6, D103.6.1, D103.6.2, D105.1, D105.2, D105.2.1 (New), D105.2.1.1 (New), D105.2.2 (New), D105.2.2.1 (New), D105.2.2.2 (New), D105.2.2.3 (New), D105.2.2.4 (New), D105.2.2.5 (New), D105.2.2.6 (New), FIGURE D105.2.2.6 (New), AASHTO (New), AASHTO Chapter 80 (New)

Proposed Change as Submitted

Proponents: Scott Brody, Self (sbrody96@gmail.com)

2024 International Fire Code

Revise as follows:

503.2.2 Authority. The *fire code official* shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire or rescue operations or where necessary to meet the public safety, health, environmental, historic preservation, or other objectives of the jurisdiction.

Add new text as follows:

503.2.1.1 Single Lane Fire Apparatus Access Roads. Single lane fire apparatus access roads shall be not less than 12 ft (3658 mm) wide, and shall comply with all of the following:

1. The road shall be one-way, a one-way lane channel of a divided two-way road, or closed to ordinary motor vehicle traffic. **Exception:** In exclusively residential areas, a single bi-directional driving lane shall be permitted where designed in accordance 503.2.1.2.
2. The route from the Fire Station to the dwelling shall require traveling no more than 600 ft (182.88 m) until the nearest turnoff to another road, and there shall be no more than 1200 ft (365.76 m) of one lane road segments for each emergency service trip, unless approved otherwise.
3. A minimum 75 foot long (22.86 m) × 21 ft (6401 mm) wide passing space shall be installed not less than every 600 ft (182.88 m).
   - 3.1 Where parking is naturally prohibited in the vicinity of hydrants, active driveways, intersections, or other approved locations, these spaces shall be permitted to be counted toward the passing bay requirements.
   - 3.2 Where there are turnoffs to other roads not less than every 400 ft (121.92 m), passing bays are allowed to be omitted.
4. The road width at curves shall be increased where necessary to accommodate the swept path of all emergency vehicles.
5. The road shall not terminate in a dead end.
6. The route from the Fire Station to all buildings shall not be overly circuitous. The fire code official is authorized to modify the location and level of interconnection between fire apparatus access roads where their design is insufficient.
7. All parallel parking spaces shall be a minimum of 7 ft (2134 mm) wide.
8. Angle parking, and reverse angle parking, shall only be permitted where designed in accordance with approved dimensions.
9. All parking spaces shall be marked for the entire extent of the space with lines indicating the border between the outer edge of the parking space, and the fire apparatus travel lane. The fire code official is authorized to require the placement of enhanced signage and road markings indicating that the central lane must be kept clear at all times.

10. The fire code official is authorized to require a sufficient number of locations be provided for deliveries, maintenance vehicles, passenger drop-off/pickup, snow storage, or any other extenuating circumstance that results in excessive blockage of the road. The width of such spaces shall be determined based on the types of vehicles which are likely to require use of the space, and shall be approved.
11. Where a narrower street could impede apparatus access, or pose a risk that arriving pumpers would need to get too close to the building in order to establish a connection to the automatic sprinkler system and standpipe system, the fire code official is authorized to require installation of approved remote or interconnected fire department connections, or a fire pump system.
12. Buildings shall be equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
13. Where the travel distance on single lane roads exceeds 600 ft (182.88 m), and buildings sited along single lane road(s) have a combined occupant load of 350 persons or more, Automated External Defibrillators (AED) shall be made available and maintained within 450 ft (137.16 m) of all locations.
14. Except for one and two-family dwellings, and other *approved* low risk occupancies, construction type shall be IA, IB, IIA, IIIA, IV (A,B, or C), or V-A.
15. Buildings over 3 stores or 30 ft (9144 mm) above grade plane shall be provided with approved aerial apparatus access.

503.2.1.2 Traffic Demand-based Street Widths. Where a fire apparatus access road is assigned a functional classification of local road or minor collector, or is similarly described per another classification scheme, and the road's average daily traffic volume does not routinely exceed 2000 vehicles per day, the street widths in Section 503.2.1.2.1 and Section 503.2.1.2.2 shall be permitted. Parking ratios shall comply with Section 503.2.1.2.3.

503.2.1.2.1 Two way streets parking one-side. For two-way streets where parking is permitted on one side only, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.1.

Table 503.2.1.2.1 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING ON ONE SIDE

Dwelling units, Sleeping units and Mixed Use

Per Gross Acre	Minimum Width (ft)	Per Gross Hectare	Minimum Width (mm)
≤ 2.0	18	≤ .8	5486
> 2 to 6	24	> .8 to 2.4	7315
> 6 to 10.0	28	>2.4 to 4.0	8534
Mixed use and > 10	32	Mixed use and > 4.0	9754

503.2.1.2.2 Two-way streets, parking both sides. For two way streets where parking is permitted on both sides, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.2.

TABLE 503.2.1.2.2 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING BOTH SIDES

Dwelling Units, Sleeping units and Mixed Use

Per Gross Acre	Minimum Width (ft)	Per Gross Hectare	Minimum Width (mm)
≤2.0	20	≤.8	6096
> 2 to 6.0	26	>.8 to 2.4	7925
> 6 to 10	30	> 2.4 to 4.0	9144
Mixed use and > 10	34	Mixed use and >4.0	10360

503.2.1.2.3 Parking ratios residential. In residential districts, the parking ratios shall comply with Table 503.2.1.2.3 or the widths shall comply with high density (6.1 to 10.0 DU/ac or 2.5 to 4.0 DU/ha).

TABLE 503.2.1.2.3 PARKING RATIOS

Dwelling Unit or Sleeping Unit Charactertistics	Minimum number of off-street spaces
≤ 1 bedroom	1.75
2 bedrooms	2.0
Detached housing with ≥ 3 bedrooms	2.5

Revise as follows:

503.4.1 Traffic calming. ~~Traffic calming shall be prohibited unless approved by the fire code official.~~ Traffic calming shall comply with the requirements of Table 503.4.1. Treatments shall be approved by the fire code official based on ability to accommodate the width and turning movements of fire apparatus.

Add new text as follows:

TABLE 503.4.1 TRAFFIC CALMING

Roadway Type/Location	Design to Achieve 85 percentile space mean speed not less than		Maximum Distance[a]	
	mph	km/h	ft	m
Parking lot drive aisles	10	16.09	1000	304.8
Fire Lanes closed to civilian vehicle traffic and woonerfs[b]	10	16.09	1000	304.8
Midblock pedestrian and bicycle crossings (all roadway functional classifications)	10	16.09	Immediate vicinity of crossing only	
Turning movements near urban crosswalks and bicycle path crossings (all roadway functional classifications)	5	8.05	Immediate vicinity of turn only	
Local Roads	18.6	30.00	2000	609.6
Minor collector roads	18.6	30.00	2000	609.6
Major collector, Minor arterial roads, other principle arterial freeways and expressways	Prohibited unless approved by the fire code official			
Other roads	As approved			

a. Fire services shall be provided an approved route to access all structures which does not require traveling more than 2000 ft (609.6 m)
on traffic calmed local and minor collector streets. Streets themselves shall be permitted to contain more than 2000 ft (609.6 m) of traffic
calming, provided that emergency services do not have to travel beyond 2000 ft (609.6 m) as part of their route.

b. Woonerfs shall be permitted to follow the 10 mph (16.09 km/h) design speed even if assigned a different formal functional classification.

503.4.2 Special Hazards. Fire apparatus access roads shall be permitted to be split into segments not less than 12 ft (3658 mm) wide, where necessary to address the following hazards:

1. To prevent vehicle operators from entering opposing travel lane(s) to bypass railroad or drawbridge gates.
2. To prevent vehicle operators from swerving around others stopped for pedestrians, bicyclists, or similar hazards at a crosswalk.

Exemption: The minimum width of a roadway divided in accordance with 503.4.2 shall be 10 ft (3048 mm), where the elements that divide the roadway are traversable by fire apparatus.

SECTION D102
DEFINITIONS

D102.1 DEFINITIONS. For the purpose of this appendix, certain terms are defined as follows:

Add new definition as follows:

DRIVING LANE. The portion of a fire apparatus access road which is permanently available for driving vehicles.

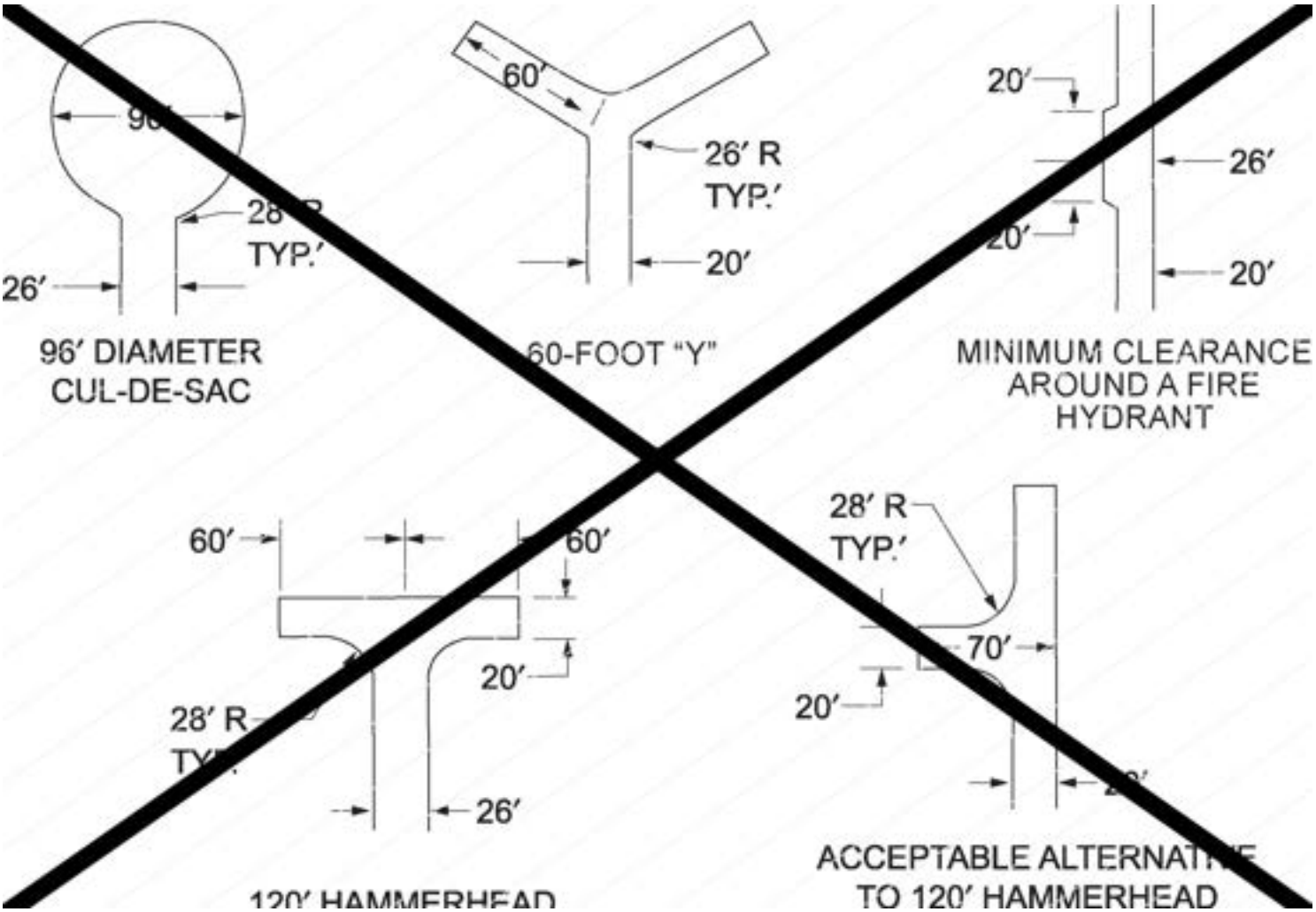
WORKING AREA. A designated area beside the fire apparatus access road, which is available for the placement of outriggers, hose lines, and other staging activates. This could be sidewalk, grass, or another surface, provided there are not excessive obstructions which would impede staging.

SECTION D103
MINIMUM SPECIFICATIONS

Revise as follows:

D103.1 Access road width with a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders ~~(see Figure D103.1)~~.

Delete without substitution:



For SI: 1 foot = 304.8 mm.

FIGURE D103.1 DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND

Add new text as follows:

D103.1.1 Hydrant access width reductions. The minimum width of fire apparatus access roads in the vicinity of hydrants shall be reduced to 21 ft (6401 mm) for two-lane roads, or 12 ft (3658 mm) for divided roads, where hydrants are placed not less than 7 ft (2134 mm) back from the nearest roadway edge.

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as *approved* by the *fire code official*.

D103.3 Turning radius. The minimum turning radius shall be determined by the *fire code official*.

Revise as follows:

D103.4 Dead Ends. Dead end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with turnaround provisions in accordance with Table D103.4. *A Policy on Geometric Design of Highways and Streets, by the American Association of State Highway and Transportation Officials.*

Delete without substitution:

TABLE D103.4 REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0-150	20	None required
151-500	20	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
501-750	26	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
Over 750		Special approval required

For SI: 1 foot = 304.8 mm.

D103.5 Fire apparatus access road gates. Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. Where a single gate is provided, the gate width shall be not less than 20 feet (6096 mm). Where a fire apparatus road consists of a divided roadway, the gate width shall be not less than 12 feet (3658 mm).
2. Gates shall be of the horizontal swing, horizontal slide, vertical lift or vertical pivot type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be *approved* by the *fire code official*.
6. Methods of locking shall be submitted for approval by the *fire code official*.
7. Electric gate operators, where provided, shall be *listed* in accordance with UL 325.
8. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

D103.6 Signs. Where required by the *fire code official*, fire apparatus access roads shall be marked with permanent "NO PARKING—

FIRE LANE" signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.

D103.6.1 Roads 20 to 26 feet in width. *Fire lane* signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

D103.6.2 Roads more than 26 feet in width. *Fire lane* signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

Revise as follows:

D105.1 Where required. Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 feet (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the *exterior wall*, or the top of parapet walls, whichever is greater. **Exception:** Where *approved* by the *fire code official*, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having firefighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

Add new text as follows:

D105.2.1 Reductions in Width Permitted with Enhanced Fire Service Equipment. Aerial apparatus access roads shall be permitted to be narrowed on account of the fire service having specialized equipment, in sufficient quantity, to negate the need for wider roadways. All solutions, or combinations thereof, shall be approved by the fire code official and the fire chief. For the purposes of this code, alternative systems shall include but not be limited to:

1. Ladder trucks with specialized capabilities, including but not limited to the following:
   - 1.1 Narrower truck bodies and/or narrower or zero spread outriggers.
   - 1.2 Aerial equipment which does not require outriggers for safe deployment.
   - 1.3 Outriggers which can fit under adjacent parked vehicles, where an adjacent parking lane is provided
   - 1.4 Outriggers which are sized to fit between parallel parked vehicles, where an adjacent parking lane is provided.
   - 1.5 Outriggers with short-jacking capabilities.
2. Vehicle dolly jacks, or other parked vehicle relocation systems, carried by responding emergency service units.
   - 2.1 Manual vehicle relocation systems shall have the capability to move a typical parked passenger vehicle in 90 seconds or less when operated by a single individual, and 60 seconds or less when operated by two individuals.
   - 2.2 Vehicle relocation robots shall have the capability to move a typical parked passenger vehicle in 60 seconds or less.
   - 2.3 Vehicle relocation systems shall not be proposed along slopes or other conditions for which the system is not safely rated.
   - 2.4 Where curbing could interfere with vehicle relocation, the fire code official is authorized to require installation of alternative roadway edge delineation.
3. Push bars mounted to emergency vehicles, for relocating disabled vehicles from the path of aerial apparatus.
   - 3.1 Design strategies which would require moving lawfully parked vehicles with push bars, shall be prohibited unless approved by the fire code official.
4. Outrigger pads with enhanced strength to deploy on non-paved surfaces.

5. Taller ground ladders, or other climbing systems.
6. Light weight or telescopic ladders, where the distance between the aerial apparatus and fire is longer.
7. Fire service aircraft, including drones.

   7.1 Where aircraft are proposed, the adjacent airspace shall be sufficiently clear of obstructions to facilitate their use.

D105.2.1.1 Procedures for Furnishing Equipment. Where the fire department does not have the necessary equipment for operating on narrower streets, the *fire code official* is authorized to require payment for new equipment, and associated expenses, as a condition of approval D105.2.1.

D105.2.2 Aerial apparatus access working areas.. Aerial apparatus access routes shall be permitted to consist of a combination of driving lanes and working areas, where *approved* by the fire code official.

D105.2.2.1 Working Area Materials. Working areas shall consist of sidewalks, geo-cell reinforced grass, or any other system which has been *approved* to provide adequate support for placement of aerial apparatus stabilizers. The system shall also provide support for emergency services to walk upon and use for other staging activities.

D105.2.2.2 Total Width. The sum of the widths for the driving lane(s) and working area shall be not less than 26 ft (7925 mm).

D105.2.2.3 Driving Lane Width. Roads open to bi-directional vehicle traffic shall contain a minimum of 21 ft (6401 mm) of driving lanes. Driving lane width for one-way roads and halves of divided roads shall a minimum of 12 ft (3658 mm). Roads with less than 21 ft (6401 mm) of driving lanes shall install passing bays at the intervals specified in 503.2.1.1, or at locations deemed necessary by the fire code official.

D105.2.2.4 Working Area Placement. Working areas shall be placed directly beside driving lanes.

D105.2.2.5 Separation Between Working Area and Driving Lane. The working area and driving lane shall be permitted to be separated by a combination of any of the following, provided the design is *approved*:

1. Tactile warning surfaces for the blind.
2. Curb with a sufficiently low slope that it will not cause damage to fire apparatus traversing it.
3. Where passing is not required, full height curb.
4. Bollards, boxed plants, or other obstructions placed at sufficiently infrequent spacing so as to provide room for aerial apparatus to deploy around them.
5. Bollards with the ability to be retracted with fire department keys, or another approved retracting system.
6. Bollards that provide the ability to be run over without causing damage to the fire apparatus.

D105.2.2.6 Signage. The fire code official shall be authorized to require the posting of signage including but not limited to the maximum load capacity of the surface, the limits of the area, instructions how to operate any systems, and notices to keep the area clear of unauthorized items.

FIGURE D105.2.2.6 EXAMPLES OF SIGNS AND GROUND TILES FOR MARKING WORKING AREAS

Add new standard(s) as follows:

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street, NW, Suite 249
Washington, DC 20001

GDHS - 7th edition A Policy on Geometric Design of Highways and Streets

Reason: The US currently has a traffic crash fatality rate several times many peer nations. IFC® Section 503 and Appendix D is likely responsible for 5-10% of US traffic deaths. Every year, roughly 4,000 Americans lose their lives on non-rural neighborhood streets. That's more than the average number of people killed in all fires in a typical year. If the US adopted traffic calming and narrower streets like most of the world, data suggests over half these deaths, at least 2,000 fatalities could be prevented on local streets alone. The benefits simply outweigh the risk.

Lack of exercise causes hugely more deaths than fires. The ban on scale streets leads to neighborhoods which are less attractive for non-motorized transportation. Narrower streets could also reduce road noise and air pollution, both of which kill more persons than fires. The US has an impervious surface the size of Ohio. Wider streets have been shown to cause more ecosystem depletion, drainage problems, and vehicle-wildlife collisions.

My cost analysis analyzed 41.5 miles (66.8 km) of streets fronting nearly 5,000 dwelling units. Calculations show wider streets typically raise the cost of new housing by several thousand dollars. Wider streets further cost the economy through maintenance expenditures and diminished land productivity.IFC® Section 503 and Appendix D were made with the intention of saving lives from fire and other emergencies. However, in the years since, countless places have leapfrogged the United States in fire safety and emergency medical response, despite not having as wide roads. Wide and non-traffic calmed streets are two of the most ineffective investments for improving response time. Other measures like interconnected streets and sprinklers are more effective and proposed as an alternative pathway for compliance. There are also many tactics which can be used, and my proposed language would help fire departments deploy them. Certain fire access passages appear to have been preempted by US Federal Regulations, international treaties, UN Resolutions, and the ICC's own requirements to write standards in a fashion as internationally applicable as possible. This proposal aims to resolve conflicts between the IFC® Fire Access sections, and other laws in a fair and balanced manner.This proposal specifically allows narrower streets if they are more interconnected. For one lane roads, homes are to be sprinklered. For commercial, must provide 1-hr fire resistant construction and AEDs for large developments. This should ensure fire safety is achieved without compromising road safety.

IFC Fire Access Proposal Narrative.pdf

https://www.cdpaccess.com/proposal/9078/30852/files/download/4858/

See PowerPoint slides I prepared for your organization: https://www.cdpaccess.com/proposal/9078/30852/files/download/4433/See full video I prepared for your organization:

Statement to the IFC FCAC 12 06 2023 https://www.youtube.com/watch?v=nTHcZ1v3DP0

Bibliography: The values found in tables referenced in Section 503.2.1.2 were adapted and used with permission from Institute of Transportation Engineers (ITE), based on Neighborhood Street Design Guidelines Table 3 – 1. ISBN: 10: 1-933452-49-8. ISBN 13: 978-1-933452-48-71627. Institute of Transportation Engineers, I Street, NW, Suite 550, Washington, DC, 20006, USA.See reason statement PDF and PowerPoint for additional in-text citations.

Cost impact (key sources):

US Department of Transportation. Highway Investment Analysis Methodology 2015 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance. [Online] 2015. https://www.fhwa.dot.gov/policy/2015cpr/appendixa.cfm.

DiClerico, Dan. True Cost Guide: Install Asphalt Paving. HomeAdvisor - Powered by Angi. [Online] August 14, 2021. Used price data collected in 2020 and kept on website through late 2021. https://web.archive.org/web/20210814132509/https://www.homeadvisor.com/cost/outdoor25 living/install-asphalt-paving/.

National Fire Protection Association & Newport Partners. Home Fire Sprinkler Cost Assessment. [Online] 2013. https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics34 and-reports/Suppression/HomeFireSprinklerCostAssessment2013.ashx.

Note many other sources were considered in my cost model, which can be shared with the committee of requested. I am not including it publicly because planning to publish in a journal and exact values could be adjusted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **Study Locations.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4813/
- **Cost study sample calc.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4812/
- **Statistical Calculations.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4811/
- **Results by neighborhood class.PNG**
  https://www.cdpaccess.com/proposal/9078/30852/documentation/148268/attachments/download/4810/

Estimated Immediate Cost Impact:

Context sensitive, traffic-demand based, standards yielded savings in 20 of 25 neighborhoods sampled. Compared with the as-built scenario, reflexive of what is typically built in the US including some exemptions from fire code officials and legacy codes, AASHTO/ITE standards which I am proposing reduced average road surface by 18.9 m2 (204 SF) per dwelling. (IQR: 17.1 –23.3 m2). This is estimated to reduce new home cost by $5,731. Compared with a strict adherence scenario, savings is $6,839 per new home.

For single lane roads, it is estimated cost savings would be 103k$/100 meters, typical of the length of an apartment building.

Cost of sprinklers estimated at 3,501$/home for an NFPA 13R system, per NFPA data. I assume the cost of building construction upgrade to 1 hour fire resistant would be rather low, and could be to a degree offset if it is also better at providing insulation over the life cycle. Exact costs for this vary by building type.

Estimated Immediate Cost Impact Justification (methodology and variables):

To understand resource consumption differs, 66.8 km (41.5 mi) of road spread over 210 local 13 streets in 25 neighborhoods were analyzed. Sample streets fronted 4,985 dwelling units. By recording characteristics of each neighborhood, it was possible to ascertain current roadway characteristics, and how much surface would be required if the same community were built using different standards.

I used average cost per lane mile of construction per US Department of Transportation Highway Economics Requirements System, and the rate private sector pays to build roads per Home Advisor. Also counted land and utility costs. The average of these resulted in a unit price of 261.96 $/m2 (24.34$/ft2) for building a new paved surface, and 3.14 $/m2/year ($0.2918$/ft2/year) in repair costs. This is $1.12

M/lane-km or $1.80 M/lane-mile.

Considering average rates of utility service subscription (ie, what percentage subscribe to gas, electric, cable TV/fiber, public water, and sewer), each ft of road was associated with 955.49 $/m (291.23$/ft) in total utility new build costs and 14.58 $/m/yr (4.44$/ft/yr) in average repair costs.

For roads built to AASHTO/ITE context sensitive widths vs existing codes, costs per dwelling unit are shown below by density. Note immediate cost impact is shown as New Construction Sav. (paving + utilities) whereas lifecycle costs are show as annual repair.

Estimated Life Cycle Cost Impact:

Life cycle cost savings from less road repair is $72.26 per DU per year vs typical scenario, and $85.01 per DU per year comparing context sensitive streets scenario vs strict compliance with existing codes.

I am planning to publish my research on a peer reviewed journal. I can share further mythology/research with the committee outside the public meeting.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Same as above except did not use average of public and private costs, assumed roads generally turned over to government, so only used USDOT HERS repair cost rates for the repaving.

Attached Files

- **IFC Fire Access Proposal Narrative.pdf**
  https://www.cdpaccess.com/proposal/9078/30852/files/download/4858/

F72-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This was disapproved with general concern for how it would be integrated in existing communities and infrastructure. In addition communities vary widely in their needs. It was felt such specific requirements would be better located within an appendix. (Vote 13-0)

F72-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 503, 503.2.1, 503.2.2, 503.4.1, 503.4.2, SECTION D103, D103.1, D103.4, TABLE D103.4, FIGURE D103.1, AASHTO Chapter 80, AASHTO (New), SECTION D105, D105.1, D105.1.1 (New), D105.1.2 (New), FIGURE D105.1 (New), D105.3, SECTION D108 (New), D108.1.1 (New), D108.1.2 (New), D108.1.3 (New), D108.1.4 (New), D108.1.5 (New), D108.1.5.1 (New), FIGURE D108.1.5.1 (New), D108.1.5.2 (New), FIGURE D108.1.5.2 (New), D108.1.5.3 (New), D108.1.5.4 (New), D108.1.5.5 (New), D108.1.5.6 (New), D108.1.5.7 (New), D108.1.5.8 (New), D108.1.5.9 (New), D108.1.6 (New), D108.1.7 (New), D108.1.8 (New), D108.1.9 (New), D108.1.10 (New), D108.2 (New), D108.2.1 (New), D108.2.2 (New), D108.2.3 (New), D108.2.4 (New), D108.2.5 (New), D108.3 (New), D108.3.1 (New), D108.3.2 (New), D108.3.3 (New), D108.3.4 (New), D108.3.5 (New), D108.3.6 (New), D108.3.7 (New), FIGURE

D105.2.2.6, D108.3.8 (New), D108.3.9 (New), D108.3.10 (New), D108.3.11 (New), 503.2.1.2 (New), 503.2.1.2.1 (New), Table 503.2.1.2.1 (New), 503.2.1.2.2 (New), TABLE 503.2.1.2.2, 503.2.1.2.3 (New), TABLE 503.2.1.2.3, D109.4 (New), D109.5 (New), D109.6 (New), D110 (New), TABLE 503.4.1 (New), SECTION D108, D108.1, TABLE D108.1

Proponents: Scott Brody, Self (sbrody96@gmail.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

SECTION 503
FIRE APPARATUS ACCESS ROADS

Revise as follows:

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), ~~exclusive of shoulders, exceptfor~~ *approved* ~~security gates in accordance with Section 503.6~~, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

503.2.2 Authority. The *fire code official* shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire, ~~or~~ rescue, or other emergency service operations; or where necessary to meet the public safety, health, environmental, historic preservation, or other objectives of the jurisdiction.

Revise as follows:

503.4.1 Traffic calming. Traffic calming shall be ~~prohibited unless approved by the fire code official.~~ designed to avoid excessive delay to emergency services and shall accommodate the width and turning movements of fire apparatus. Vertical deflections shall not cause fire apparatus to bottom out. Traffic calming designs, and locations of placement, shall require approval of the fire code official.

503.4.2 Special Traffic Hazards. Fire apparatus access roads shall be permitted to be split into segments not less than 12 ft (3658 mm) wide, where necessary to address the following hazards:

1. To prevent vehicle operators from entering opposing travel lane(s) to bypass railroad or drawbridge gates.
2. To prevent vehicle operators from swerving around others stopped for pedestrians, bicyclists, or similar hazards at a crosswalk.

Exemption: The minimum width of a roadway divided in accordance with 503.4.2 shall be 10 ft (3048 mm), where the elements that divide the roadway are traversable by fire apparatus.

SECTION D103
MINIMUM SPECIFICATIONS

Revise as follows:

D103.1 Access road width ~~with~~at a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width in the immediate vicinity shall be ~~26 feet (7925 mm)~~ 21 feet (6401 mm) for undivided roads or 12 ft (3658 mm) for divided roads. ~~, exclusive of shoulders.~~ The hydrant shall be located at least 5 feet (1524 mm) back from the roadway edge, or the roadway width shall be increased proportionally.

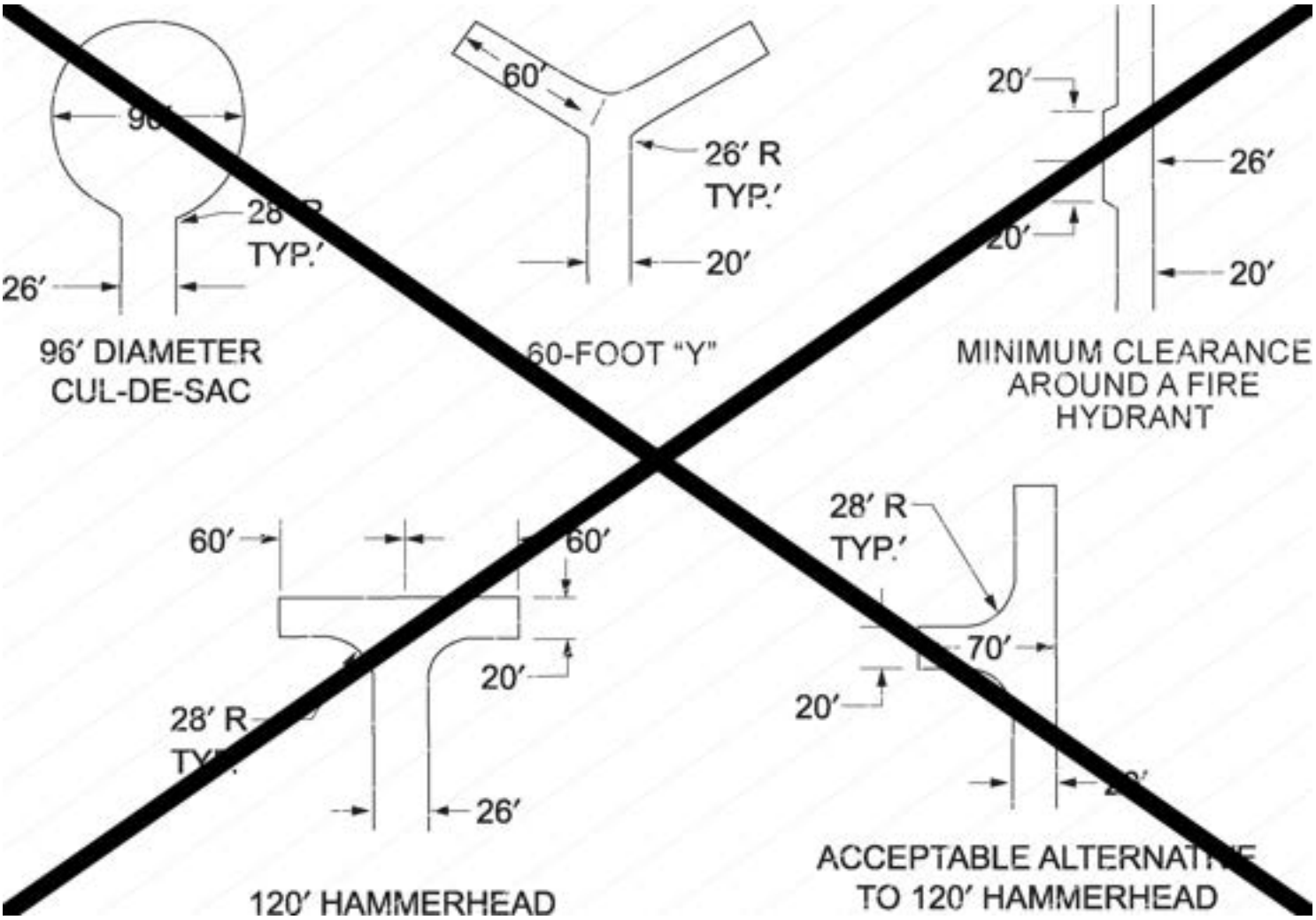
D103.4 Dead Ends. Dead end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with turnaround provisions in accordance with ~~Table D103.4~~ *A Policy on Geometric Design of Highways and Streets, by the American Association of State Highway and Transportation Officials.*

Delete without substitution:

~~TABLE D103.4 REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS~~

~~LENGTH (feet)~~	~~WIDTH (feet)~~	~~TURNAROUNDS REQUIRED~~
~~0–150~~	~~20~~	~~None required~~
~~151–500~~	~~20~~	~~120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1~~
~~501–750~~	~~26~~	~~120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1~~
~~Over 750~~		~~Special approval required~~

~~For SI: 1 foot = 304.8 mm.~~



~~For SI: 1 foot = 304.8 mm.~~

~~FIGURE D103.1 DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND~~

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street, NW, Suite 249
Washington, DC 20001

GDHS - 7th edition A Policy on Geometric Design of Highways and Streets

SECTION D105

AERIAL FIRE APPARATUS ACCESS ROADS

Revise as follows:

D105.1 Where required. Where the vertical distance between the *grade plane* and the highest roof surface exceeds 30 feet (9144 mm), *approved* aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the *exterior wall*, or the top of parapet walls, whichever is greater. ~~**Exception:** Where *approved* by the *fire code official*, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having firefighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.~~

Add new text as follows:

D105.1.1 Exemptions to Where Required. Where *approved* by the *fire code official*, buildings of Type IA, Type IB, Type IIA, or Type IV (A, B, or C) construction equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and having firefighter access through an enclosed *stairway* with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

D105.1.2 Alternative Measurement for Buildings with Enhanced Fire Resistance. The vertical distance in D105.1 shall be permitted to be measured between the ground and the highest emergency escape and rescue opening in buildings of Type IA, IB, IIA, IIIA, IV (A,B, C, or HT), or V-A construction; where approved by the fire code official; where equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, 903.3.1.2, 903.3.1.3, or 904.11; and where firefighter access is provided to all roof surfaces via an enclosed *stairway* of Type IA, Type IB or Type IIA construction, with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

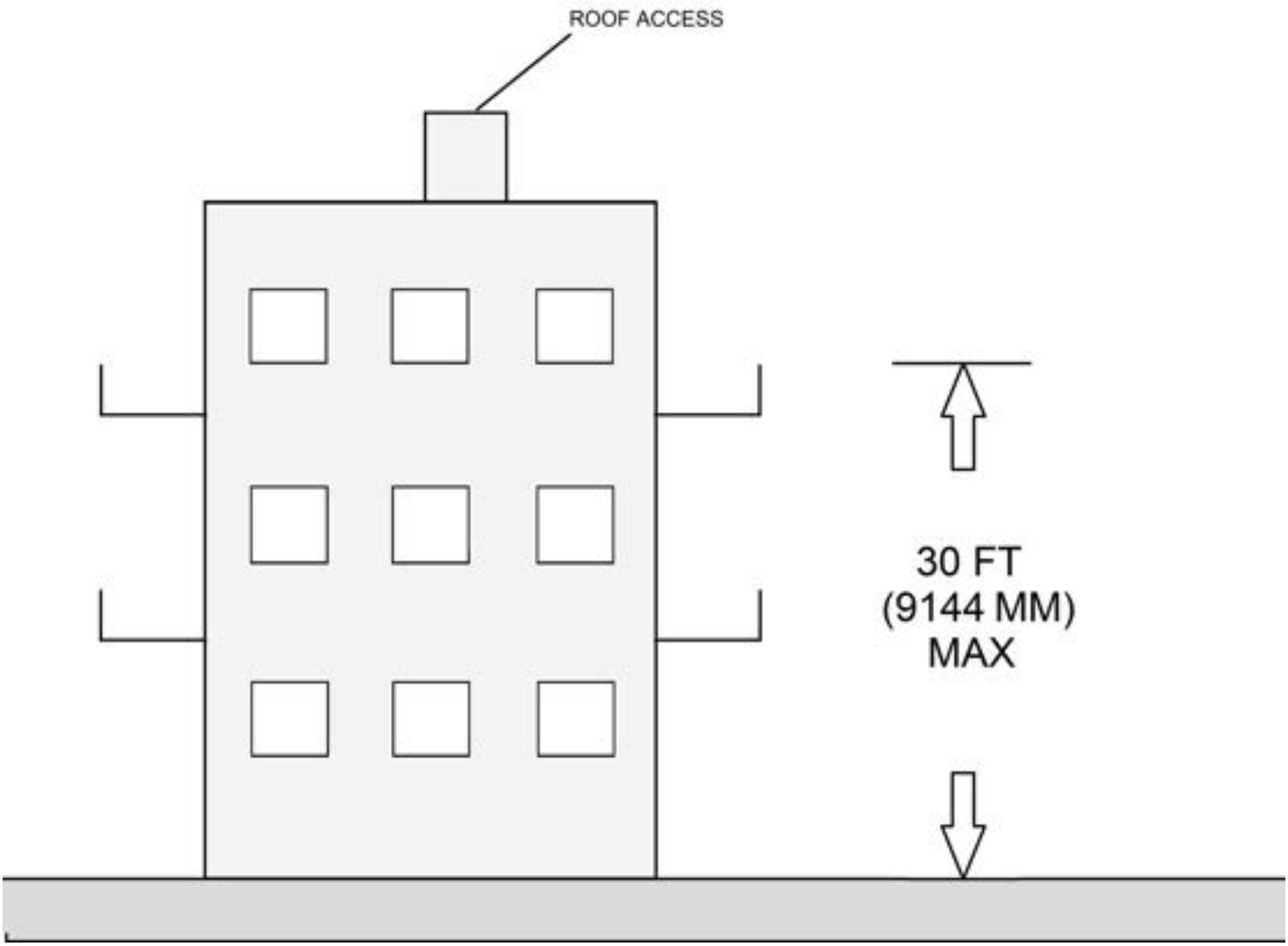


Figure showing measurement to highest balcony ledge or windowsill in accordance with D105.1 Exemption.

FIGURE D105.1 Alternative Measurement for Buildings with Enhanced Fire Resistance

Revise as follows:

D105.3 Proximity to building. One or more of the required access routes meeting this condition shall be located not less than 15 feet (4572 mm) and not greater than 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be *approved* by the *fire code official*.

Where approved by the fire code official, in buildings of Construction Types IA, IB, IIA, IIIA, IV (A,B, C, HT), or V-A; the minimum horizontal separation between the building and road shall be permitted to be omitted where the building is separated into compartments with not less than a 2-hour fire resistance, or a building has a narrow frontage.

Add new text as follows:

SECTION D108
SINGLE LANE FIRE APPARATUS ACCESS ROADS

D108.1.1 Travel Direction, Divided Roads, and Roads Closed to Civilian Traffic. The road shall be one-way, a one-way lane channel of a divided two-way road, or closed to ordinary motor vehicle traffic.

D108.1.2 Maximum Travel Distance via Primary Driving Route. There shall be no more than 1000 ft (304.8 m) of single lane road segments for each emergency service drive within the area, unless otherwise approved.

1. Travel via the primary access route shall not require contraflow driving.
2. The 1000 ft (304.8 m) maximum trip length shall apply to both arriving and departing trips.
3. The road which connects to the single lane fire apparatus road shall conform to 503.2.1 or D109.

D108.1.3 Secondary Access. A secondary access route shall be provided. There shall be no more than 1000 ft (304.8 m) of single lane road segments for each emergency service drive via the secondary access route, within the area, unless otherwise approved.

1. The secondary access route shall be permitted to include travel on the same road(s) as the primary route, arriving via the opposite and contraflow direction.
2. For larger developments, the fire code official shall be authorized to require single lane roads connect to a second road conforming to 503.2.1 or D109.
3. The 1000 ft (304.8 m) maximum trip length shall apply to both arriving and departing trips.

D108.1.4 Maximum Distance to Entrance via Walking Route. All buildings shall have an entrance within 650 ft (198.12 m) of a road conforming to 503.2.1 or D109, via an approved walking route, unless otherwise approved.

D108.1.5 Parking and Block Design. Parking spaces for emergency services, and block sizes, shall be in accordance with D108.1.5

D108.1.5.1 Parking Space Locations. Emergency vehicle parking spaces shall be located in accordance with Figure D108.1.5.1.

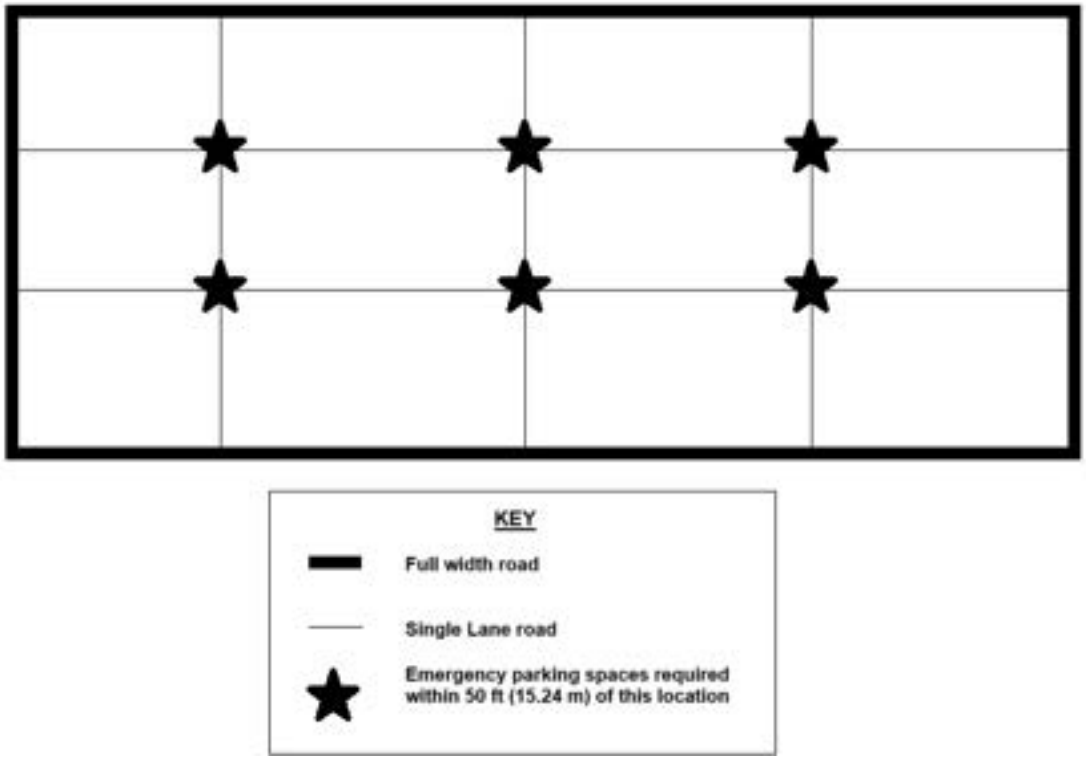


FIGURE D108.1.5.1 Intersections where Emergency Vehicle Parking Spaces Required

D108.1.5.2 Parking Space Design. Emergency vehicle parking spaces shall be designed in accordance with Figure D108.1.5.2.

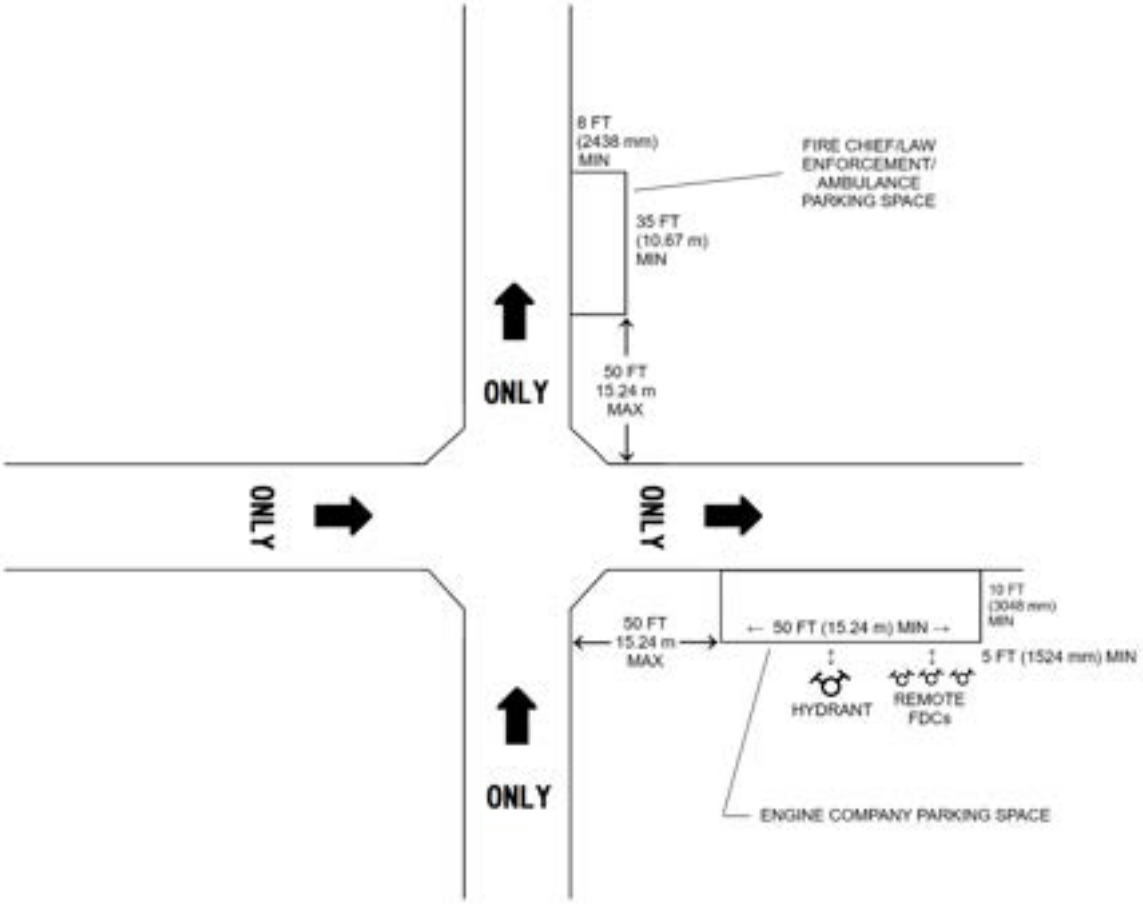


FIGURE D108.1.5.2 Emergency Vehicle Passing Space Dimensions

D108.1.5.3 Short Blocks. Where all blocks entering an intersection are 300 ft (91.4 m) or shorter in length, measured from center to center of each intersection, one of the two emergency vehicle parking spaces required per Figure D108.5.2 shall be permitted to be omitted. Where multiple short blocks are in a row, not less than every other intersection shall feature a fire engine sized parking space.

D108.1.5.4 Long Blocks. Any block longer than 500 ft (152.4 m) shall feature an additional 35 ft (10.65 m) long × 8 ft (2438 mm) wide minimum emergency vehicle parking spacelocated approximately 2/3rds of the way from the first to second intersection.

D108.1.5.5 Maximum Block Length. Blocks longer than 650 ft (198.12 m) shall be prohibited.

D108.1.5.6 Hydrants at Fire Engine Parking Spaces. Fire engine parking spaces shall contain fire hydrants, unless otherwise approved.

D108.1.5.7 Hydrant Placement. The fire hydrant shall be placed not less than 5 ft (1524 mm) back from the right edge of the fire engine parking space, or the road width shall be increased proportionally. Where approved by the fire code official, fire hydrants shall be permitted to face the opposite direction in lieu of being pushed back from the road.

D108.1.5.8 Remote FDCs. The fire code official shall be authorized to require fire engine parking spaces contain remote standpipe connections for nearby structures, and/or that remote standpipe connections be provided at the nearest two-lane fire apparatus access road.

D108.1.5.9 Passing Space Overlap. Portions of emergency vehicle parking spaces shall be permitted to overlap with sidewalk or bicycle lanes only where such are of sufficient strength to support fire apparatus loading, and any separation devices between the sidewalk/bike lane and road are approved. The fire code official shall be authorized to require enhanced marking of sidewalks/bike lanes designated as part of the fire apparatus access route in accordance with this section.

D108.1.6 Overly Circuitous Routes Prohibited. The route from the Fire Station to all buildings shall not be overly circuitous. The fire code official is authorized to modify the location and level of interconnection between fire apparatus access roads where their design is insufficient.

D108.1.7 Dead Ends Prohibited. Single lane fire apparatus access road(s) shall not terminate in a dead end.

D108.1.8 Parking Space Dimensions. All parallel parking spaces shall be a minimum width of 8 ft (2438 mm) wide in commercial and mixed-use areas, and 7.5 ft (2286 mm) wide in residential areas. Narrower parking spaces shall be permitted in spaces designated for compact cars only. Perpendicular parking, angle parking, and reverse angle parking shall be in accordance with approved dimensions and angles.

D108.1.9 Authority to Modify Dimensions. The Fire Code Official is authorized to modify these requirements based on jurisdictional needs, the level of risk for a particular structure, or the provision of specialized equipment.

D108.1.10 Specialized Equiptment. Proposals to adjust fire access requirements based on the purchase of specialized equipment shall require approval by the Fire Code Official and Fire Chief. Specialized equipment shall be provided to the fire department, or maintained on site at an approved location, as determined by the Fire Chief. The fire department shall be authorized to require payment for any expenses associated with specialized equipment, including training.

D108.2 Design Requirements for Buildings Along Single Lane Roads . Buildings along single lane fire apparatus access roads shall conform to D108.2.1 through D108.2.5

D108.2.1 Sprinklers. Buildings shall be equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2, 903.3.1.3, or 904.11. EXEMPTION: Buildings 400 ft^2 (37.16 m^2) or less in area shall not be required to maintain sprinkler systems for the purposes of this section.

D108.2.2 Automated External Defibrillators. Where the maximum driving distance on single lane roads exceeds 500 ft (152.4 m), and buildings sited along such road(s) have a combined occupant load of 350 persons or more, the fire code official shall be authorized to require Automated External Defibrillators (AED) be made available and maintained within 450 ft (137.16 m) of all locations on-site.

D108.2.3 Construction Type. For buildings with more than one story above ground level, construction shall be Type IA, IB, IIA, IIIA, IV (A,B, C, or HT), or V-A. EXEMPTION: One and two-family dwellings, and townhouses, shall be permitted to be any type otherwise allowed. Other types of construction shall be permitted for other building types, where approved.

D108.2.4 Authority to Restrict High Risk Structures. The fire code official shall be authorized to prohibit or restrict high-hazard occupancies, large assemblies, buildings with a high number of floors, large area buildings, or any other situation which, at the determination of the fire code official, would pose an excessive risk along single lane roads.

D108.2.5 Wildfire Prone Areas. The fire code official shall be authorized to require fire resistant landscaping be placed beside single lane roads in wildfire prone areas. The fire code official shall be authorized to restrict or prohibit single lane roads in areas of high wildfire risk.

D108.2.5 Existing Structures. The requirements of D108.2.1 through D108.2.4 shall not apply to properties which were lawfully located along an existing single lane road prior to the enactment of this code.

D108.3 Single Lane Aerial Apparatus Access Roads. Buildings over 3 stores or 30 ft (9144 mm) above grade plane, as measured in accordance with D105.1, shall be provided with aerial apparatus access in accordance with this section.

D108.3.1 Road Position. Aerial access shall be positioned parallel to one side of each building.

D108.3.2 Staging Area Required. A staging area not less than 5 feet (1524 mm) wide shall be located on both sides of the roadway. The sum of the roadway and staging area widths shall be not less than 22 ft (6706 mm). EXEMPTION: Where approved, staging area shall be permitted to be omitted on the side of a road that does not contain any structures above 30 ft (9144 mm).

D108.3.3 Staging Area Loads. The staging area shall be permitted to include roadway surface, sidewalk, bicycle paths, reinforced grass, or any other approved surface capable of supporting the imposed load of fire apparatus weighting 75,000 pounds (34 050 kg).

D108.3.4 Obstructions. The staging area shall be permitted to include streetscape items such as plants, tables, chairs, signs, and utility poles; however, the fire code official shall be authorized to limit the number of such items to ensure aerial apparatus outrigger deployment, and other emergency operations, are not compromised.

D108.3.5 Driveway Aprons. Driveway aprons shall be permitted to be included in the staging area, where designed and maintained to support the imposed loads of fire apparatus weighting 75,000 pounds (34 050 kg).

D108.3.6 Separation Devices Between Roadway and Staging Area. Curbing of an approved height shall be permitted to separate the road from sidewalk and driveways designated as part of the staging area. Where low height curb is used, bollards shall be permitted to prevent vehicle encroachment onto sidewalk. The fire code official shall be authorized to require bollards retract with a fire department key or other approved device.

D108.3.7 Marking. The fire code official shall be authorized to require making of the staging area.

FIGURE D108.3.7 EXAMPLES OF MARKINGS FOR STAGING AREAS & SEPARATION DEVICES

Add new text as follows:

D108.3.8 Parallel Parking. Use of parallel parking as a staging area for outriggers shall be permitted where approved by the fire code official and fire chief. Where parallel parking is used for outriggers, the fire code official shall be authorized to regulate space length and require 5 ft (1524 mm) gaps between the front and back of a select number of spaces, to facilitate outrigger placement.

D108.3.9 Vehicle Relocation Tools. Where a parallel parking lane is to be used as part of the staging area, the fire chief shall be authorized to require keeping approved vehicle dollies or other parked vehicle relocation tools on site or with the fire department. Vehicle dollies shall not be proposed for use on slopes beyond the safe capacity of the device.

D108.3.10 Separation from Building. The road/working area combined shall be not more than 30 ft (9144 mm) from the building. The road/working area combined shall be not less than 15 ft (4572 mm) from the building where the construction type is not IA, IB, or IV (A, B, or C). **Exemption:** In buildings of Type VA construction, having a height above grade plane not more than 60 ft (18.29 m), the 15 ft (4572 mm) minimum separation in D108.3.10 shall be permitted to be omitted where the building has not more than 60 ft (18.29 m) of frontage along the aerial apparatus access road, or where the building is divided into compartments, not more than 60 ft (18.29 m) long,

measured along the frontage of the aerial apparatus access road. Compartments shall be separated by not less than a 2-hour fire rated assembly or be an approved distance from one another.

D108.3.11 Staging Areas for Buildings Under 30 ft (9144 mm). The fire code official shall be authorized to require buildings less than 3 stories or 30 ft (9144 mm) above grade plane provide a staging area to accommodate not less than one ladder truck, from a tactically acceptable location. Multiple buildings shall be permitted to share a staging area. The fire code official shall be authorized to require additional staging areas for large buildings. Where approved, unreinforced surfaces such as grass shall be permitted to be used.

D109 Traffic Demand-based Street Widths. Where a fire apparatus access road is assigned a functional classification of local road or minor collector, or is similarly described per another classification scheme, and the road's average daily traffic volume does not routinely exceed 2000 vehicles per day, the street widths in Section 503.2.1.2.1 and Section 503.2.1.2.2 shall be permitted. Parking ratios shall comply with Section 503.2.1.2.3.

D109.1 Two way streets parking one-side. For two-way streets where parking is permitted on one side only, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.1.

Table D109.1 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING ON ONE SIDE

Dwelling/Sleeping Units Density			
Per Gross Acre	**Minimum Width (ft)**	**Per Gross Hectare**	**Minimum Width (mm)**
≤ 2.0	18	≤ .8	5486
> 2 to 6	24	> .8 to 2.4	7315
> 6 to 10.0	28	>2.4 to 4.0	8534
Mixed use and > 10	32	Mixed use and > 4.0	9754

D109.2 Two-way streets, parking both sides. For two way streets where parking is permitted on both sides, and the parking spaces are unmarked, the width of fire apparatus access roads shall comply with Table 503.2.1.2.2.

TABLE D109.2 FIRE APPARATUS ACCESS ROAD WIDTH - PARKING BOTH SIDES

Dwelling/Sleeping Unit Density			
Per Gross Acre	Minimum Width (ft)	Per Gross Hectare	Minimum Width (mm)
≤2.0	20	≤.8	6096
> 2 to 6.0	26	>.8 to 2.4	7925
> 6 to 10	30	> 2.4 to 4.0	9144
Mixed use and > 10	34	Mixed use and >4.0	10360

Add new text as follows:

D109.3 Parking ratios residential. In residential districts, the parking ratios shall comply with Table 503.2.1.2.3 or the widths shall comply with high density (6.1 to 10.0 DU/ac or 2.5 to 4.0 DU/ha).

TABLE D109.3 PARKING RATIOS

Dwelling Unit or Sleeping Unit Charactertistics	Minimum number of off-street spaces
≤ 1 bedroom	1.75
2 bedrooms	2.0
Detached housing with ≥ 3 bedrooms	2.5

Add new text as follows:

D109.4 Circuitous Designs Restricted. The route from the Fire Station to all buildings shall not be overly circuitous. The fire code official shall be authorized to modify the location and level of interconnection between new fire apparatus access roads designed in accordance

with D109, where their design is insufficient.

D109.5 Mountable Roadway Edge. The fire code official shall be authorized to require mountable roadway edges in low and medium density neighborhoods, as defined by the density defintionas in Tables D109.1 & D109.2.

D109.6 Wildfire Prone Areas. The fire code official shall be authorized to prohibit traffic demand-based street widths less than 20 ft (6096 mm) in wildfire prone areas.

D110 Traffic Calming. Traffic calming shall be designed in accordance with D110.

TABLE D110 TRAFFIC CALMING DESIGN SPEEDS AND TRAFFIC-CALMED ROADWAY LENGTH LIMITS

Roadway Type/Location	Design to Achieve 85 percentile space mean speed not less than		Maximum Distance[a]	
	mph	km/h	ft	m
Parking lot drive aisles	10	16.09	1000	304.8
Fire Lanes closed to civilian vehicle traffic and woonerfs[b]	10	16.09	1000	304.8
Midblock pedestrian and bicycle crossings (all roadway functional classifications)	10	16.09	Immediate vicinity of crossing only	
Turning movements near urban crosswalks and bicycle path crossings (all roadway functional classifications)	5	8.05	Immediate vicinity of turn only	
Local Roads	18.6	30.00	2000	609.6
Minor collector roads	18.6	30.00	2000	609.6
Major collector, Minor arterial roads, other principle arterial freeways and expressways	Prohibited unless approved by the fire code official			
Other roads	As approved			

a. The Fire Department shall be provided an approved route to access all structures which does not require traveling more than 2000 ft (609.6 m)
on traffic calmed local and minor collector streets. Streets themselves shall be permitted to contain more than 2000 ft (609.6 m) of traffic
calming, provided that emergency services do not have to travel beyond 2000 ft (609.6 m) as part of their route.

b. Woonerfs shall be permitted to follow the 10 mph (16.09 km/h) design speed even if assigned a different formal functional classification.

Revise as follows:

SECTION D108~~11~~
REFERENCED STANDARDS

D108~~11~~.1 General. See Table D108~~11~~.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE D108~~11~~.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F2200—14	*Standard Specification for Automated Vehicular Gate Construction*	D103.5
UL 325—02	*Door, Drapery, Gate, Louver, and Window Operators and Systems*, with Revisions through May 2015	D103.5

Reason: See attached document, updated June 2024.

User Note: D108 Single Lane Fire Apparatus Access Roads.About this Section: D108 establishes detailed criteria for the design of single lane fire apparatus access roads.

Purpose and Intent: Along neighborhood streets of the United States, traffic crashes often kill more people than fires. Converting

neighborhood streets from two unobstructed central lanes to one traffic-calmed lane has been shown to more than halve traffic casualties. Street width reduction can also reduce environmental harm and monetary costs associated with road construction. It may further be desired to create or preserve a historic feel, to discourage cut-through traffic, or to promote walkability - which improves public health. Many jurisdictions around the world achieve excellent levels of emergency response performance without wider roads. This Appendix section seeks to assist in regulating small streets and development. It does so by requiring enhanced safety features to counter possible delay and access impacts. Street widths are designed to accommodate the standard North American fire apparatus.

Bibliography: For cost impact, see ICC Building Valuation Data.

https://www.iccsafe.org/wp-content/uploads/BVD-BSJ-FEB21.pdf

Other sources in reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Most costs will stay the same vs my previous proposal. The biggest difference is allowance of up to 1 floor of Type VB construction along new single lane roads, vs previously I required all one hour fire resistant construction. This will likely result in <5% savings per Square Foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

I considered cost per square ft from ICC building valuation data. For detailed cost info on overall proposal, see previous filing submitted before CAH 1.

Estimated Life Cycle Cost Impact:

Lifecycle cost will likely be similar to my previous proposal, because although additional allowance for Type VB could reduce some maintenance expenses (especially the complexity of maintaining firestops), lightweight wood might be less insulating as well. Therefore, there might be worse thermal bridging and energy consumption, vs some other forms like if wood were insulated via natural wool in a VA assembaly.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

This is only a qualitative approximation; therefore no specific variables were used. For detailed cost info on overall proposal, see previous filing submitted before CAH 1.

Attached Files

- **Fire Access Narrative Updated June 2024.pdf**
  https://www.cdpaccess.com/comment/573/32927/files/download/8065/

Comment (CAH2)# 573

F73-24

IFC: 507.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

507.1 Required water supply. An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. Reclaimed water or recycled water shall be analyzed to evaluate any health hazard and to determine whether any materials, chemicals or contaminants in the water will be detrimental to the components of the fire water supply or fire-extinguishing systems and a report shall be submitted to the fire code official for approval prior to acceptance as fulfilling the requirement for water supply.

Reason: In recent years there has been a increased desire to utilize recycled or reclaimed water for fire fighting purposes. The long-term goal of water conservation is important to improve sustainability, but the quality of recycled or reclaimed water used for fire fighting must meet considered.

There are two aspects of concern: 1) does the water contain any contaminants that will be detrimental to the fire protection equipment and appliances used in fighting the fire, and 2) does the water present any health hazard as fire fighters are doused with water during the firefighting operations.

NFPA 13, the standard for fire sprinkler system design allows the use of recycled or reclaimed water, provided the water quality is tested and evaluated. 2022 NFPA 13 reads:

5.2.1 Water supplies for sprinkler systems shall be one of the following or any combination:

1. A connection to an approved public or private waterworks system in accordance with 5.2.2
2. A connection including a fire pump in accordance with 5.2.3
3. A connection to a water storage tank at grade or below grade installed in accordance with NFPA 22 and filled from an approved source
4. A connection to a pressure tank in accordance with 5.2.4 and filled from an approved source
5. A connection to a gravity tank in accordance with 5.2.5 and filled from an approved source
6. A penstock, flume, river, lake, pond, or reservoir in accordance with 5.2.6
7. * A source of recycled or reclaimed water where the building owner (or their agent) has analyzed the source of the water and the treatment process (if any) that the water undergoes before being made available to the sprinkler system and determined that any materials, chemicals, or contaminants in the water will not be detrimental to the components of the sprinkler system it comes in contact with

Annex A in NFPA 13 contains some additional guidance to Item 7 above, and states "…Recycled or reclaimed water should never be used in a sprinkler system until an analysis of what contaminants might be in the water has determined that nothing will be detrimental to sprinkler system performance or the expected reasonable life of the sprinkler system."

Fire fighters routinely splashed or drenched with water from fire sprinklers, fire hoses, and other fire fighting appliances. The firefighters should be wearing their structural fire-fighting personal protective equipment, but that equipment is not designed to keep water off their body, and to limit skin contact with fire fighting water.

The quality of the water must be evaluated for health reasons and for the efficacy of the fire fighting equipment. It would be foolish to install expensive automatic fire fighting systems and then run water through it that will corrode it internally, or plug the orifices of sprinklers. This proposal allows recycled water or reclaimed water to be utilized, but the quality of the water must be analyzed for provide adequate protection from health risks to fire fighters and for the longevity and reliability of the fire fighting appliances.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement to analyze the water already exists, but as the desire increases to use recycled water this proposal places the requirement in the code so it is not missed.

F73-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Though the intent was understood there was concern that water supply issues generally go beyond what NFPA 13 addresses. (Vote 11-2)

F73-24

Individual Consideration Agenda

Comment 1:

IFC: 507.1, 507.1.1 (New)

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

507.1 Required water supply. An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. ~~Reclaimed water or recycled water shall be analyzed to evaluate any health hazard and to determine whether any materials, chemicals or contaminants in the water will be detrimental to the components of the fire water supply or fire-extinguishing systems and a report shall be submitted to the fire code official for approval prior to acceptance as fulfilling the requirement for water supply.~~

Add new text as follows:

507.1.1 Reclaimed or recycled water. Where the water supply contains reclaimed water or recycled water, the water shall be analyzed to evaluate any health hazard and to determine whether any materials, chemicals or contaminants in the water will be detrimental to the components of the fire water supply or fire-extinguishing systems. A report shall be submitted to the fire code official for approval prior to acceptance as fulfilling the requirement for water supply.

Reason: This code change was Disapproved at CAH 1. Discussion from CAH 1 has been considered and this comment contains revisions as a result.

The main revision in this comment is that a new section is created to deal with reclaimed or recycled water. The use of reclaimed and recycled water is spreading across the country. Reclaimed and recycled water is being proposed for a variety of uses.

At CAH 1, it was stated that NFPA 13 provides guidance on the use of reclaimed or recycled water, this is correct. The problem is that the

criteria in NFPA 13 only applies to sprinkler systems. Reclaimed and reused water is being proposed for fire hydrant systems and other firefighting uses where NFPA 13 would not apply. NFPA 13 only covers sprinkler systems, it does not address other fire-extinguishing or fire protection systems, such as standpipes. Therefore, the inclusion of the criteria in the IFC will ensure the code official can address the situation.

It was stated that an applicant would receive a double-whammy when they had to comply with the requirements in the IFC and NFPA 13. If both the IFC and a referenced standard contain requirements on a topic, then as stated in IFC Section 102.7.1, the requirements in the IFC govern. The applicant is not required to comply with both sets of requirements.It was also stated that the fire engine would need to be flushed out after using the reclaimed water. The reality is that fire engines do not carry potable water. The water in the tank often remains in that tank for extended periods. Fire equipment often uses water from ponds, rivers, canals and lakes. The need to flush a pump on a fire engine is not new, and it certainly is not only going to occur when reclaimed or recycled water is utilized.

ICC is currently in the process of developing criteria for the use of reclaimed and recycled water. At this time, recycled water and reclaimed water will be allowed for fire protection purposes. This will ensure that the level of reclamation and filtration is adequate and safe for the firefighters and equipment.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There will be a cost for testing water, but it is not mandatory. The cost will only occur where the applicant chooses to utilize reclaimed or recycled water.

Estimated Immediate Cost Impact Justification (methodology and variables):

A sample water test could run from $50 to $400.

Comment (CAH2)# 759

F74-24

IFC: 507.2, B103.3

Proposed Change as Submitted

Proponents: Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

2024 International Fire Code

Revise as follows:

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

Exception: In rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to approve the use of NFPA 1142 or the *International Wildland-Urban Interface Code* where it is adopted.

B103.3 Areas without water supply systems. For information regarding water supplies for firefighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code*.

Reason: Because of the rural character of many regions of the majority of states, strict compliance with 507.2 is not always feasible. NFPA 1142 and IWUIC accommodate some alternatives. NFPA 1142 and IWUIC are allowed in the IFC code under Appendix B, but adding the exception allows NFPA 1142 or IWUIC to be used without adopting all of Appendix B.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Total cost savings: **$14,272** for a single-family home with an attached garage, as the building would not need to include on-site water storage.

This code change would be cost savings because it gives the code users another option to provide water to extinguish a fire. This option allows water to be supplied by the fire department instead of being kept on-site. This is common in rural areas where there's not a municipal water distribution network. Many factors will come into play in developing a water supply for fire flow. To simplify this estimate we looked at a single-family home with an attached garage and using plastic water tanks to store the water.

This cost estimate does not include any necessary maintenance of fire department equipment, nor the cost of acquiring the water (via pumping or other acquisition method).

Estimated Immediate Cost Impact Justification (methodology and variables):

NFPA 1142 states (as an acceptable method to calculate fire flow)

Eq 4.3.1
WS_{min}=VStot/OHC * CC * 1.5

WS_{min}= min Water Supply

VS_{tot}= Total volume of structure (ft^3)

OHC=Occupancy hazard Classification number

CC= Construction Classification number

For example a single-family home 2 stories with an attached garage

V_{garage} = 24' x 24' x 10'=5760

V_{house} = 2 stories x 8'H stories x 40'x 30'19200

V_{tot} = 19200+5760 = 24,960 ft^3

OHC = 7 (per NFPA 1142 5.2.5.2 dwellings)

CC = 1.5 (per NFPA 1142 Table 6.2.1 Type V)

WS_{min}= VS_{tot}/OHC * CC * 1.5=24,960 ft^3 / 7 x1.5 x1.5 = 8023 gallons

Use two 5,000 gallon tanks @ $5,136 each https://www.ntotank.com/5000gallon-norwesco-black-vertical-water-tank-x1750809

Shipping cost estimate $1,000

plumbing cost estimated $1,000

Site work estimate

$2,000

Total cost savings $14,272

F74-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Generally it was felt that this concept belongs in an appendix. Also concern with the wording of "where it is adopted" and how it applies to the use of NFPA 1142 and the WUIC. It was noted that NFPA 1142 has good information but it is generally easy to apply when needed without being referenced in the code. (Vote 12-0)

F74-24

Individual Consideration Agenda

Comment 1:

IFC: 507.2

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS DOS, NYS DOS (chad.sievers@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

Exception: In rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to approve the use of NFPA 1142 or, where adopted, the *International Wildland-Urban Interface Code* ~~where it is adopted~~.

Reason: The modification to this proposal clarifies that 'where it is adopted' is intended to apply only to the IWUIC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification is an editorial change to clarify that the language 'where it is adopted' applies only to the IWUIC.

Comment (CAH2)# 550

F82-24

IFC: 604.3.4

Proposed Change as Submitted

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org)

2024 International Fire Code

Revise as follows:

604.3.4 Temperature Control ~~Machine room ventilation~~.. Where standby power is connected to elevators and a temperature control means is provided in accordance with Section 3005.2 of the *International Building Code*, the temperature control means ~~the machine room ventilation or air conditioning~~ shall be connected to the standby power source.

Reason: To correlate the title and requirements with IBC Section 3005.2. The current titles and language are misleading because the real purpose is to provide standby power for the means to control the temperature for proper operation of the elevator equipment. This public comment to modify the proposal correlates with the public comment and proposal for 3003.1.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in the requirement for standby power, only a clarification to better align with another section in the IBC.

F82-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as there was concern that the machine room ventilation may be losing the necessary standby power and heating is not explicitly addressed. (Vote 14-0)

F82-24

Individual Consideration Agenda

Comment 1:

IFC: 604.3.4

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

604.3.4 ~~Machine room ventilation~~ Temperature control. Where standby power is connected to elevators, ~~the machine room ventilation~~

~~or air conditioning shall be connected to the standby power source~~ the system for temperature control of spaces containing elevator equipment provided in accordance with Section 3005.2 of the International Building Code, shall be connected to the standby power source.

Reason: The requested changes are needed to correlate the title and requirements with IBC Section 3005.2 which was updated in the 2024 edition. “Temperature Control” more accurately describes the function and avoids confusion with “venting” which refers to the removal of smoke and gases during a fire. “Temperature Control” is used in other parts of the Code. Standby power is needed not just for cooling of the equipment to prevent overheating, but also to maintain the temperature in the appropriate range to ensure proper operation of the elevator. If the temperature in the equipment rooms and spaces is allowed to drop below acceptable levels, the elevator may not function properly. The alternate language addresses a comment from committee during CAH#1 to clarify that the standby power is any system provided to comply with 3005.2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is clarifying the requirement not changing it; therefore, there is no cost associated with the proposed change.

Comment (CAH2)# 482

F86-24

IFC: SECTION 611 (New), 611.1 (New), 611.1.1 (New), 611.2 (New), 611.3 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new text as follows:

SECTION 611
ELECTRIC VEHICLE CHARGING STATIONS

611.1 Disconnects. Locations containing electric vehicle charging stations shall be provided with a clearly identified and readily accessible emergency disconnect installed in an approved location.

611.1.1 Alternative Disconnects. Where approved, a disconnect provided to comply with NFPA 70 can be utilized to meet the disconnect requirement when it is clearly identified, and the location is accessible to the fire department.

611.2 Height. Where provided, the height of the emergency disconnect shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating device. The disconnect shall be distinctly labeled EMERGENCY ELECTRIC VEHICLE CHARGER DISCONNECT.

611.3 Fire Extinguishers. Approved portable fire extinguishers complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided and located such that an extinguisher is not more than 75 feet (23 860 mm) from electric vehicle charging stations.

Reason: Electric vehicle charging stations are becoming more prominent as electric vehicles gain popularity. The fire service needs a safe means to disconnect these charging stations from their power supply to be able to safely extinguish a fire involving the charging stations and/or the vehicle being charged. This new code sections provides accessible emergency disconnects to safely shut power off to the charging stations. The new code section allows for alternative disconnect that is in compliance with NFPA 70 plus code language for the height of the disconnect, signage and fire extinguishers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Research was conducted and the typical immediate cost increase for each installation would be less than $50.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost impact is very small as most installation already have a means to disconnect the power from the EV Charger. A small increase may be necessary in terms on additional conduit and wire if the disconnect needs to be installed in a location the is accessible for the fire service and away from the charger. Research was conducted and the cost increase for each installation would be less than $50.

F86-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:

~~611.3 Fire Extinguishers~~.

~~Approved portable fire extinguishers complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided and located such that an extinguisher is not more than 75 feet (23 860 mm) from electric vehicle charging stations.~~

Committee Reason: This proposal provides the basic requirements for emergency shutoff for electric vehicle charging stations similar to that provided for other types of fuels. The modification removes a requirement for fire extinguishers as there are currently no extinguishers available for lithium ion battery fires. Fire extinguishers will be generally be addressed by Section 906. There was some concern with the use of the term "accessible" as it may be confused with accessibility requirements for those with disabilities. (Vote 10-4)

F86-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 611, 611.1, 611.1.1, 611.2

Proponents: Shlyneice Davis, National Electrical Manufacturers Association (NEMA), National Electrical Manufacturers Association (NEMA) (shlyneice.davis@nema.org); Megan Hayes, NEMA, NEMA (megan.hayes@nema.org); Bryan Holland, National Electrical Manufacturers Association (NEMA), National Electrical Manufacturers Association (NEMA) (bryan.holland@nema.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

SECTION 611
ELECTRIC VEHICLE CHARGING STATIONS

Revise as follows:

611.1 ~~Disconnects~~ Disconnecting Means . For permanently connected electric vehicle supply equipment and wireless power transfer equipment, equipment disconnects and emergency shutoff shall be installed in accordance with NFPA 70. ~~Locations containing electric vehicle charging stations shall be provided with a clearly identified and readily accessible emergency disconnect installed in an approved location.~~

Delete without substitution:

~~**611.1.1 Alternative Disconnects.** Where approved, a disconnect provided to comply with NFPA 70 can be utilized to meet the disconnect requirement when it is clearly identified, and the location is accessible to the fire department.~~

~~**611.2 Height.** Where provided, the height of the emergency disconnect shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating device. The disconnect shall be distinctly labeled EMERGENCY ELECTRIC VEHICLE CHARGER DISCONNECT.~~

Reason: It is essential that requirements in the IFC are perfectly correlated with the requirements for electric vehicle power transfer systems in NFPA 70. Section 625.43 of the 2026 NEC First Draft includes very detailed requirements for both equipment disconnects and emergency shutoff. All the

concerns cited in the reason statement to Proposal F86-24 are adequately addressed in the NEC. Pointing users of the IFC to the NEC will ensure all installations are in compliance with both codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal points the user to the NEC for the prescriptive installation requirements therefore the cost impact neither increases or decreases.

Comment (CAH2)# 365

Comment 2:

Proponents: Steven Rosenstock, Edison Electric Institute, Edison Electric Institute (srosenstock@eei.org); Genevieve Cullen, Electric Drive Transportation Association (EDTA), EDTA (gcullen@electricdrive.org); Emily Kelly, ChargePoint (emily.kelly@chargepoint.com); Rick Tempchin, Alliance for Transportation Electrification (rick@evtransportationalliance.org); Tessa Sanchez, Tesla, Tesla, Inc. (tesanchez@tesla.com) requests As Modified by Committee (AMC1)

Reason: The Committee got it right. Any vehicle can catch on fire, but portable fire extinguishers are not required be located near gasoline or diesel or natural gas or propane vehicles.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 415

Comment 3:

Proponents: Abid Anwar, Tesla (aanwar@tesla.com) requests Disapproved

Reason: F-86 was Approved As Modified by Committee. The proposal provides no technical justification or risk basis to necessitate the redundancy or scope increase from NFPA 70 Section 625.43 Equipment Disconnect requirements. Whereas Article 625 of NFPA 70 requires a readily accessible disconnect located in an accessible location where equipment is rated more than 60A, this proposal would require emergency disconnects for all charging stations regardless of residential vs. commercial use or DC fast charging vs. AC charging for occupancies regulated by this code.

1. Testimony was provided indicating necessity due to the following:
2. First responders require readily accessible disconnects and current disconnects are often inaccessible without site personal to provide access Emergency disconnect requirements are common at gas stations, similar emergency disconnecting devices should be provided.

Electric vehicles and EV charging infrastructure are safe and do not constitute a previously unknown hazard. There is no risk to public safety or first responders that justifies approval of these code modifications given the requirements in NFPA 70. Article 625 of NFPA 70 already requires the installation of disconnecting means in readily accessible locations where equipment is rated more than 60A or more than 150 volts to ground. Charging cables are only energized when connected and locked to the electric vehicle and communication is established between the charging equipment and the vehicle. The flow of electricity to the charging cable is automatically shut off if the charging connector is unlocked or communication between the vehicle and charging equipment ceases. Additionally, Tesla vehicles are less likely to experience a vehicle fire than internal combustion engine (ICE) vehicles. According to data released by NFPA and U.S. Department of Transportation, in the United States there is a vehicle fire for every 19 million miles traveled. By comparison, from 2012 – 2021, there was approximately one Tesla vehicle fire for every 210 million miles traveled, which is ten times less.1

Regarding the need for consistency with gas stations, emergency response considerations for fuel dispensing stations bear no similarities with electrical fires at charging stations. Homologation with gas station disconnect requirements creates greater hazard for first responders and the general public who may attempt to intervene. Activation of the emergency disconnect when responding to a fuel fed fire is accompanied with lessening fire activity, similar positive indicators do not exist for electrical equipment providing a false sense of security. Activation of a similar disconnect at an EV charging station would not inform First Responders of what upstream proximally located equipment remains energized.

To disconnect power to a site, first responders should cut the lock on the electrical switchgear, locate the main feeder breaker, turn the handle to the OFF position, and verify the absence of AC hazard sources with available tools. Tesla provides detailed instructions for deenergizing a Supercharger site in our Emergency Response Guide. 2 Utilization of the disconnecting means at the switch gear is superior to an emergency stop button as this provides a physical break to create an open circuit.

Tesla is committed to helping fire departments and first responders safely handle emergency situations involving all Tesla products. We have trained thousands of first responders to appropriately handle Tesla vehicles and batteries through virtual and in-person training, through provision of decommissioned vehicles, support lines, and attendance at relevant safety and code conferences. While Tesla understands the intent of the proposals in keeping first responders and the public safe in the unlikely event of an electrical fire at an EV charging station, we are concerned that the proposed code language would lead to unintended consequences.

Bibliography: Reference citation 1:https://www.tesla.com/VehicleSafetyReport

Reference citation 2:https://www.tesla.com/firstresponders

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 553

Comment 4:

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests Disapproved

Reason: F86-24 should be Disapproved. It is not needed, as 2023 NFPA 70 (NEC) Article 625.43 already requires disconnecting means for EVSE and WPTE rated more than 60 amperes or more than 150 volts to ground. The NEC already requires that the disconnecting means shall be provided and installed in a readily accessible location.

F86-24 states that the disconnecting means already required by NFPA 70 can be considered an "alternative disconnect." How is a disconnect that is already required to be installed be considered alternative by the IFC?

The fire extinguisher requirement has already been removed by a modification, as the Committee Reason Statement indicated there are currently no extinguishers available for lithium ion battery fires.

ICC style has been trying to eliminate the use of the word "accessible" where it does not relate to access compliance.

Proposal F86-24 adds a a new section to the IFC, but does not seem to add any value with respect to safety for first responders or users of EVs or EV chargers, beyond the safety requirements already provided in the National Electrical Code.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

F88-24

IFC: 705.2.4

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

705.2.4 Door operation. Swinging *fire doors* shall close from ~~the full open~~a door-open position of 90 degrees (1.57 rad) and latch automatically.

Reason: There is a conflict in the requirements for swinging fire doors specific to the functionality of the door closing hardware.

- The IBC §716.1 and IFC §705.2 require opening protectives to comply with NFPA 80. This includes fire doors and door-closing devices on fire doors.
- IFC §405.2 requires inspection and testing of fire doors.
- IFC §705.2.4 requires fire doors to close and latch from the **full open** position.
- NFPA 80 §5.3.5.2 states that swinging doors with fire door hardware must close from the **full open** position.
- NFPA 80 §5.3.6.2 states that swinging doors with fire door hardware must close from the **any open** position.
- NFPA 80 Chapter 7, which is specific to swinging doors with fire door hardware requires fire doors to close from **any open** position.

This proposal intends to clarify the actual requirement for initial acceptance and periodic inspection and testing. There are contradictory requirements, and as a result a multitude of interpretations and applications of the requirement.

Even if a door swings to 180 degrees, when an occupant uses that door to exit, they will not routinely open it the full 180-degree swing—more likely a 90-degree swing is what will happen. Chapter 10 requires measurement of the clear width of egress opening at 90 degrees.

Where NFPA 80 states the door must close from any open position, does that mean full open, 90 degrees open, or 1 degree open? I would be surprised to see door closers close and latch from a 1 degree position, but I would expect from 90 degrees or more.

So, if we consider “full open” to be 90 degrees or more, we can the test at 90 degrees as the worst case for that range. Testing fire doors in an existing building from a 90-degree position seems to be the logical solution.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will not change the cost of construction. This proposal clarifies the method of inspection to ensure proper operation of the door through its life span.

F88-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Based upon the proponent's recommendation and testimony. There are many times doors have to operate in more than just a 90° opening in order to meet the egress

requirements and therefore they should be tested in any position. (Vote: 14-4)

F88-24

Individual Consideration Agenda

Comment 1:

IFC: 705.2.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

705.2.4 Door operation. ~~Swinging fire doors shall close from a door-open position of 90 degrees (1.57 rad) and latch automatically.~~ Automatic-closing swinging fire doors shall close and latch from the full-open position and from any position of 30 degrees (0.52 rad) open to full-open. Self-closing swinging fire doors shall close and latch from any position of 30 degrees (0.52 rad) open to full-open.

Exception: Self-closing and automatic-closing swinging fire doors with closers utilizing cables, chains or ropes, and pulleys and counterweights shall close and latch from any open position.

Reason: This proposal was Disapproved at the request of the speakers at CAH 1. The reason for requesting disapproval was to come back with revised text which provided more details with regard to testing requirements. Communications between the proponent and the Builders Hardware Manufacturer's Association (BHMA) have resulted in this revised comment.

It was discussed at CAH 1 that the door needs to be tested at more angles than just 90 degrees, which the original proposal stated. And it was also stated that doors are not always opened to the full-open position which is the current requirement in the IFC. IFC Section 705.2.4 requires doors to close and latch from the full-open position. From the perspective of automatic-closing swinging fire doors which are held open with a magnetic release, this is appropriate. However, consider swinging fire doors which are self-closing, and swinging fire doors permitted to be automatic-closing when they are in the self-closing mode – how far open should these doors be when released to verify they close and latch automatically. Remember swinging fire doors permitted to be automatic-closing are also required by the IBC and NFPA 80 to be self-closing. BHMA recommends self-closing doors be required to close and latch when released from a door-open position of 30 degrees and greater, which is consistent with NFPA 80 requirements for swinging fire doors with spring hinges. It is well known, and summarized in the original reason statement: The IBC requires opening protectives to be installed in accordance with NFPA 80. And, the IFC requires these opening protectives to be inspected and maintained in accordance with NFPA 80.

Unfortunately, NFPA 80 has differing requirements for closing and latching of swinging door opening protectives:

- The requirements for inspection and testing of swinging doors with builders hardware or fire door hardware (the vast majority of fire doors currently being installed), in Item 7 of 5.2.3.5.2 (NFPA 80-2022) requires the door to completely close when operated from the full open position.
- The requirements for inspection and testing of swinging doors with fire door hardware (the old-style metal clad fire doors typically closed with pulleys, chains, cables, ropes, counterweights, and/or fusible links) in Item 13 of 5.2.3.6.2, requires these doors to close completely from any open position.
- The requirements for installation of swinging doors with builders hardware or fire door hardware in Chapter 6 of NFPA 80, in 6.4.1.4, state the closing mechanism is to be adjusted...so that positive latching is achieved on each door operation. And, specifically, 6.4.1.5 requires doors with spring hinges are to achieve positive latching with the door is allowed to close freely from an open position of no more than 30 degrees.

The exception covers doors which use pulleys and counterweights to provide door closure. These doors are designed to close from any

open position, so the 30-degrees does not apply.

Considering the life-safety importance of fire doors that close and latch, the variety of requirements in NFPA 80, the ambiguity of current IFC and IBC requirements, and that specificity in the code (i.e. IFC) overrides similar requirements in reference standards, it is recommended that swinging fire doors close and latch when tested at a door-open position of 30 degrees or greater and at full open.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will not change the cost of construction. This proposal clarifies the method of inspection to ensure proper operation of the door through its life span.

Comment (CAH2)# 732

F90-24

IFC: 708.1, 708.2 (New)

Proposed Change as Submitted

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

2024 International Fire Code

708.1 Maintaining protection. Where required when the building was originally permitted and constructed, spray fire-resistant materials and intumescent fire-resistant materials shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

Add new text as follows:

708.2 Repair of Spray Fire-Resistant Materials and Intumescent FIre-Resistant Materials. Where damaged, materials used to protect columns, beams and horizontal assemblies shall be repaired, replaced or restored in accordance with the listing, the manufacturer's repair instructions and with the same materials and thicknesses used in the *listing*. Where the *listing* is not known, repairs shall be made with the same material type and thickness that exists.

Reason: In the 2024 IFC it is that SFRM and IFRM Fireproofing need to be visually inspected. This proposal completes the action by adding a repair section. Because fireproofing is installed in accordance with a fire-resistance listing and manufacturers instructions, it needs to be repaired with a listed repair system. When the listing is not known, guidance is provided to repair with the same type of material an the same thickness. Too many times we see thick fireproofing repaired with skim coats over fireproofing void and not the same thickness as exists on the rest of the beam, column or assembly. It is critical the repair method have the appropriate material, material type and where possible, match new construction listing to provide continues fire-resistance protection.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The reason this proposal has no impact is that this proposal reflects what actually should happen. Anything less is a fire and life safety risk.

F90-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for the approval of the proposal were: This completes the coverage of requirements from installation to repairs. This is really well written and it is a needed proposal that addresses the gap. When it says replaced or restored in accordance with this listing, it will cover everything else that you are doing. (Vote:14-0)

F90-24

Individual Consideration Agenda

Comment 1:

IFC: 708.2

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

708.2 Repair of sprayed ~~fire-resistant~~ fire-resistive materials and intumescent ~~fire-resistant~~ fire-resistive materials. ~~Where damaged, materials used to protect columns, beams and horizontal assemblies shall be repaired, replaced or restored in accordance with the listing, the manufacturer's repair instructions and with the same materials and thicknesses used in the *listing*. Where the *listing* is not known, repairs shall be made with the same material type and thickness that exists.~~ Materials used to protect columns, beams and horizontal assemblies shall be securely bonded to the substrate without evidence of deterioration or damage, or delamination, cracks or voids through which the substrate is exposed. Where the original material and listing is known or can be identified, such damage shall be repaired, replaced or restored to the requirements of the listing in accordance with the manufacturer's repair instructions. Where the original material or listing is not known or is no longer available, repairs shall be made with the same material type and thickness as originally used.

Reason: This item was Approved at CAH 1. This comment intends to clarify the language and ensure that where a listing is known and available, the listing must be followed.

The title and language throughout are editorially revised to refer to sprayed fire-resistive materials.

The section is designed to address to situations: 1) where the fire-resistive material can be identified and the listing is known; and 2) where the material cannot be identified or the listing is not known or is no longer available. In the first scenario, the repair must be made in accordance with the listing and the manufacturer's repair instructions. In the second, the repair is to be accomplished with a material of the same type and to the same thickness.

The original proposal stated "where damaged". This term leaves a lot to interpretation, such as how much damage is a problem, or what if it is compressed, etc. This comment provides some guidance as to the intent with the additional language of delamination, voids and exposure of substrate. This will provide information and guidance to the inspector.

The ultimate goal of this proposal is to accomplish repair of damaged or failing sprayed fire-resistive materials. It is critical that repair be done to the appropriate level of protection to maintain an adequate level of safety for the building and occupants.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment is simply clarifying the application of the requirements.

Comment (CAH2)# 522

F93-24

IFC: 807.4, 807.4.1, 807.4.1.1 (New)

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fire Code

807.4 Artificial decorative vegetation. Artificial decorative vegetation shall comply with this section and the requirements of Sections 806.2 and 806.3. Natural decorative vegetation shall comply with Section 806. **Exception:** Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

Revise as follows:

807.4.1 Flammability. ~~Artificial~~ The flammability of artificial decorative vegetation shall be assessed in accordance with one of the following:
~~meet the flame propagation performance criteria of~~

1. Where tested in accordance with NFPA 701 using Test Method 1 or Test Method 2, as appropriate, ~~of NFPA 701~~ the artificial decorative vegetation shall meet the flame propagation performance criteria. ~~Meeting such criteria shall be documented and certified by the manufacturer in an approved manner~~
2. ~~Alternatively, the artificial decorative vegetation shall be~~ Where tested in accordance with NFPA 289 ~~,~~ using the 20 kW ignition source, ~~and~~ the artificial decorative vegetation shall have a maximum heat release rate of 100 kW.

Add new text as follows:

807.4.1.1 Documentation. The test report and compliance with acceptance thresholds shall be documented and certified by the manufacturer in an approved manner.

Reason: Editorial rewrite for clarification. No change in requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No change in requirements.

F93-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
2024 International Fire Code
Revise as follows:

807.4.1 Flammability. The flammability of artificial decorative vegetation shall be ~~assessed~~ in accordance with one of the following:

1. Where tested in accordance with NFPA 701 using Test Method 1 or Test Method 2, as appropriate,the artificial decorative vegetation shall meet the flame propagation performance criteria.
2. Where tested in accordance with NFPA 289 using the 20 kW ignition source, the artificial decorative vegetation shall have a maximum heat release rate of 100 kW.

Committee Reason: The committee stated that the reason for the approval of the modification was that it deletes an unnecessary word. The stated reasons for the approval of the proposal with the modification were: It arranges it in a legible and appropriate way, and it separates the two different areas of criteria. It is editorial and does not make any modifications. The section on documentation is helpful for the code official so that they can verify code compliance. (Vote: 14-0)

F93-24

Individual Consideration Agenda

Comment 1:

IFC: 807.4

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

807.4 Artificial decorative vegetation. Artificial decorative vegetation in other than Group U occupancies shall comply with this section and the requirements of Sections 806.2 and 806.3. Natural decorative vegetation shall comply with Section 806. **Exception:** Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

Reason: This proposal was Approved at CAH 1. This Comment revises Section 807.4.1 by indicating the provisions do not apply to Group U occupancies.

It does not seem necessary to regulate these materials in Group U occupancies which include Barns, Carports, Communication equipment, Fences, Grain silos, Greenhouses, Livestock shelters, Private garages, Retaining walls, Sheds, Stables, Tanks, and Towers.

Group U occupancies are often not even included in a routine inspection program.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This will reduce cost, but only in Group U occupancies. It is doubtful that artificial decorative vegetation is used in Group U occupancies, so while there is technically a decrease, it is negligible.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost of artificial decorative vegetation is less than $100 per unit.

Comment (CAH2)# 556

F100-24

IFC: 903.2.8, 903.2.8.1, 903.2.8.2, 903.2.8.3, 903.3.1.3; IBC: [F] 903.2.8, [F] 903.2.8.1, [F] 903.2.8.2, [F] 903.2.8.3, [F] 903.3.1.3

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

2024 International Fire Code

Revise as follows:

903.2.8 Group R. An *automatic sprinkler system* installed in accordance with Section 903.3.1 shall be provided throughout all buildings with a Group R *fire area*.

Delete without substitution:

~~**903.2.8.1 Group R-3.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~

~~**903.2.8.2 Group R-4, Condition 1.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~

~~**903.2.8.3 Care facilities.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family *dwelling*.~~

Revise as follows:

903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4, Condition 1~~; and *townhouses*~~ shall be permitted to be installed throughout in accordance with NFPA 13D.

2024 International Building Code

Revise as follows:

[F] 903.2.8 Group R. An *automatic sprinkler system* installed in accordance with Section 903.3.1 shall be provided throughout all *buildings* with a Group R *fire area*.

Delete without substitution:

~~**[F] 903.2.8.1 Group R-3.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~

~~**[F] 903.2.8.2 Group R-4, Condition 1.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~

~~**[F] 903.2.8.3 Care facilities.** An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in care *facilities* with five or fewer individuals in a single-family *dwelling*.~~

Revise as follows:

[F] 903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4, Condition 1~~; and *townhouses*~~ shall be permitted to be installed throughout in accordance with NFPA 13D.

Reason: Code requirements in Section 903.2.8 and 903.3.1 currently conflict with respect to the types of sprinkler systems permitted for some residential occupancies. Subsections to 903.2.8 specify which sprinkler standards are permissible for some Group R uses, but Section 903.3.1 has different allowances for NFPA 13D to be used, particularly for townhouses which are covered in the scope of NFPA 13D but aren't always classified as Group R3. NFPA 13D as an appropriate standard for townhouse protection is currently recognized in Section 903.3.1.3 but not in Section 903.2.8. Rather than correlating these sections, it makes more sense to have the applicable requirements reside in one location in the code, and Sections 903.3.1 (including 903.3.1.1, 903.3.1.2 and 903.3.1.3) are currently sufficient to entirely support Section 903.2.8. For ease of following what this proposal accomplishes and how the sections will work together if the proposal is approved, relevant extracts from Section 903.3.1 in the 2024 IBC are reproduced below:

[F] 903.3.1 Standards. Automatic sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1 unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

[F] 903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an automatic sprinkler system in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Sections 903.3.1.1.1 through 903.3.1.1.3.

[F] 903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above grade plane.

2. For other than Group R-2 occupancies, the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access. For Group R-2 occupancies, the roof assembly is less than 45 feet (13 716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.

3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access. The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

[F] 903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one- and two-family dwellings; Group R-3; Group R-4, Condition 1; and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal eliminates a conflict between code sections and duplication. Technical requirements remain unchanged.

F100-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
2024 International Fire Code

903.3.1.3 NFPA 13D sprinkler systems.
Automatic sprinkler systems installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4~~, Condition 1~~ shall be

permitted to be installed throughout in accordance with NFPA 13D.

2024 International Building Code

[F] 903.3.1.3 NFPA 13D sprinkler systems.
Automatic sprinkler systems installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4~~, Condition 1~~ shall be permitted to be installed throughout in accordance with NFPA 13D.

Committee Reason: The committee stated that the reason for the approval of the modification was based on the recommendation from the floor testimony. The stated reason for the proposal with the modification was based on the proponent's reason statement and testimony. (Vote: 11-0)

F100-24

Individual Consideration Agenda

Comment 1:

IFC: 903.3.1.2.3, 903.3.1.3, 903.3.1.3.1 (New); IBC: [F] 903.3.1.2.3, [F] 903.3.1.3, [F] 903.3.1.3.1 (New)

Proponents: Jeffrey Shapiro, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

903.3.1.2.3 Attics. Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an *automatic sprinkler system*.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4 of the International Building Code, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access needed to meet the provisions in Section 503:
   3.1. Provide *automatic sprinkler system* protection.
   3.2. Construct the attic using noncombustible materials.
   3.3. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the International Building Code.
   3.4. Fill the attic with noncombustible insulation.

. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the *exterior wall*, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.

~~4. Group R-4, Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:~~

~~4.1. Provide *automatic sprinkler system* protection.~~

~~4.2. Provide a heat detection system throughout the attic that is arranged to activate the building *fire alarm system*.~~

~~4.3. Construct the attic using noncombustible materials.~~

~~4.4. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the International Building Code.~~

~~4.5. Fill the attic with noncombustible insulation.~~

903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4 shall be permitted to be installed throughout in accordance with NFPA 13D.

Add new text as follows:

903.3.1.3.1 Attic protection for Group R-4, Condition 2. Attic protection shall be provided for Group R-4, Condition 2 as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an automatic sprinkler system.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Attics not required by Item 1 to have sprinklers shall comply with one of the following:
   3.1 Provide automatic sprinkler system protection.
   3.2 Provide a heat detection system throughout the attic that is arranged to activate the building fire alarm system.
   3.3 Construct the attic using noncombustible materials.
   3.4 Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the *International Building Code*.
   3.5 Fill the attic with noncombustible insulation.

2024 International Building Code

Revise as follows:

[F] 903.3.1.2.3 Attics. *Attic* protection shall be provided as follows:

1. *Attics* that are used or intended for living purposes or storage shall be protected by an *automatic sprinkler system.*
2. Where fuel-fired equipment is installed in an unsprinklered *attic*, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.

3. Where located in a *building* of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4, *attics* not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access needed to meet the provisions in Section 503.

   3.1. Provide *automatic sprinkler system* protection.

   3.2. Construct the *attic* using noncombustible materials.

   3.3. Construct the *attic* using *fire-retardant-treated wood* complying with Section 2303.2.

   3.4. Fill the *attic* with noncombustible insulation.
   The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503 of the *International Fire Code*.

~~4. Group R-4, Condition 2 occupancy *attics* not required by Item 1 to have sprinklers shall comply with one of the following:~~

~~4.1. Provide *automatic sprinkler system* protection.~~

~~4.2. Provide a heat detection system throughout the *attic* that is arranged to activate the building *fire alarm system.*~~

~~4.3. Construct the *attic* using noncombustible materials.~~

~~4.4. Construct the *attic* using *fire-retardant-treated wood* complying with Section 2303.2.~~

~~4.5. Fill the *attic* with noncombustible insulation.~~

[F] 903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings* and *townhouses*; Group R-3; and Group R-4 shall be permitted to be installed throughout in accordance with NFPA 13D.

Add new text as follows:

[F] 903.3.1.3.1 Attic protection for Group R-4, Condition 2. Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an automatic sprinkler system.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Group R-4, Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:

   3.1 Provide automatic sprinkler system protection.

   3.2 Provide a heat detection system throughout the attic that is arranged to activate the building fire alarm system.

   3.3 Construct the attic using noncombustible materials.

   3.4 Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the *International Building Code*.

   3.5 Fill the attic with noncombustible insulation.

Reason: In hindsight, I don't feel that it was clearly disclosed to the Fire Code Committee that the floor modification that was introduced to consolidate F100-24 with F101-24 had the consequence of moving R-4 Condition 2 from NFPA 13R to NFPA 13D protection. I am submitting this comment to ensure that this change is known as intentional and understood, and assuming that the Committee continues to support that path, the provisions for attic protection that were previously under NFPA 13R for R-4 Condition 2 occupancies need to be moved to NFPA 13D. This comment accomplishes that. However, if there is a desire to put R-4 Condition 2 back under NFPA 13R, a floor modification would need to be made to accomplish that.

As a reminder, Group R-4, is as follows:

> Residential Group R-4 occupancy shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 310.5.1 or 310.5.2. This group shall include, but not be limited to, the following:
>
> - Alcohol and drug centers
> - Assisted living facilities
> - Congregate care facilities
> - Group homes
> - Halfway houses
> - Residential board and care facilities
> - Social rehabilitation facilities

And, Condition 2 includes buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

The code states "Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code." Given the construction and use of Condition 2 occupancies and the fact that Condition 1 occupancies are already permitted to use NFPA 13D, I don't believe that NFPA 13R truly offers a justifiable increase in protection vs what is provided by NFPA 13D for this application, with the possible exceptions of 1) Requiring a system to be monitored and/or have an exterior alarm (which I've not proposed in this comment, but could add as a floor modification if others feel strongly about this), and 2) Adding attic protection, which I recall was placed in the code a number of years ago following a fatal fire that involved an attic (which this comment provides for).

Disclosure: I am a consultant to the National Fire Sprinkler Association, but I have not consulted NFSA and do not represent NFSA on this comment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Given that the committee has already recommended the cost reduction associated with moving R4 Condition 2 to NFPA 13D from NFPA 13R, this proposal simply moves the previously applicable attic protection provisions to NFPA 13D to stay with R4 Condition 2.

Comment (CAH2)# 778

F102-24

IFC: 903.2.8.4 (New); IBC: [F] 903.2.8.4 (New)

Proposed Change as Submitted

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov)

2024 International Fire Code

Add new text as follows:

903.2.8.4 Group R-3 occupancies less than 60 feet in height. Group R-3 occupancies referenced in Table 504.4 of the *International Building Code* shall be permitted to install an automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.

2024 International Building Code

Add new text as follows:

[F] 903.2.8.4 Group R-3 occupancies less than 60 feet in height. Group R-3 occupancies referenced in Table 504.4 shall be permitted to install an automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.

Reason: One- and two-family dwellings, manufactured homes, and townhouses are all within the scoping of NFPA 13D. This standard does not restrict the height of these structures. These types of occupancies should not be treated as equivalent to other types of residential type occupancies such as apartments or hotels and therefore should not be required to install an equivalent designed automatic sprinkler system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 or less. The design and installation of a NFPA 13D automatic sprinkler system is less than a NFPA 13R or NFPA 13 system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The size and amounts of underground and overhead piping and other materials including labor cost would be less with a NFPA13D system.

F102-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: A Group R-3 occupancy may be a one- and two-family dwelling and be outside the scope of NFPA13D. There was also concern that the not exceeding 60 feet might be too low or a bad limitation. (Vote: 14-0)

F102-24

Individual Consideration Agenda

Comment 1:

IFC: 903.2.8.4; IBC: [F] 903.2.8.4

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

903.2.8.4 Group R-3 occupancies less than 60 feet in height. Buildings that do not contain more than two *dwelling units* ~~Group R-3 occupancies referenced in Table 504.4 of the *International Building Code*~~ shall be permitted to install an automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.

2024 International Building Code

Revise as follows:

[F] 903.2.8.4 Group R-3 occupancies less than 60 feet in height. Buildings that do not contain more than two *dwelling units* ~~Group R-3 occupancies referenced in Table 504.4~~ shall be permitted to install an automatic sprinkler system in accordance with Section 903.3.1.3 when the building height does not exceed 60 feet above grade plane.

Reason: The committee may not have understood the proposal because the proponent was unable to present in person. Their reasoning for disapproval was " A Group R-3 occupancy may be a one- and two-family dwelling and be outside the scope of NFPA13D." They have this wrong. NFPA 13D scoping is as follows: "This standard shall cover the design, installation, and maintenance of automatic sprinkler systems for protection against the fire hazards in one- and two-family dwellings, manufactured homes, and townhouses."

When a one-and two-family dwelling or townhouse falls out of the scoping of the International Residential Code because it is 4 stories, it then is a Group R-3 occupancy under the International Building Code. This one- or two-family dwelling or townhouse should be allowed to be built to 4 stories or 60 feet in height without having to change the automatic fire sprinkler system from a NFPA13D to 13R which is required per Table 503.4 and 503.4 of the IBC.

I have clarified with the language change that only buildings with no more than two dwelling units and are Group R-3 from the IBC are allowed to use NFPA 13D sprinkler systems.

The second reason the committee stated for disapproval was "There was also concern that the not exceeding 60 feet might be too low or a bad limitation."

I would agree that if NFPA 13D does not have a height or story restriction, then why limit it to 60 feet?

Please reconsider this cost saving proposal to allow a NFPA 13D in lieu of a NFPA 13R system as required in Tables 503.4 and 503.4 of the IBC for *Buildings* that do not contain more than two *dwelling units.*

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Labor and materials will be reduced.

Estimated Immediate Cost Impact Justification (methodology and variables):

Less materials and labor cost will result in the decrease in cost.

Comment (CAH2)# 663

F103-24

IFC: 903.2.8.5 (New); IBC: [F] 903.2.8.5 (New)

Proposed Change as Submitted

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov)

2024 International Fire Code

Add new text as follows:

903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane.. Group R-3 occupancies referenced in Table 504.4 of the *International Building Code* shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

2024 International Building Code

Add new text as follows:

[F] 903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane.. Group R-3 occupancies referenced in Table 504.4 shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

Reason: One- and two-family dwellings, manufactured homes, and townhouses are all within the scoping of NFPA 13D. This standard does not restrict the number of stories of these structures. These types of occupancies should not be treated as equivalent to other types of residential type occupancies such as apartments or hotels and therefore should not be required to install an equivalent designed automatic sprinkler system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 or less. The installation of a NFPA 13D system is less expensive than the installation of a NFPA 13 or 13R system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of materials and labor are less for these types of systems.

F103-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval of the proposal was based on the previous action on F102. (Vote: 13-1)

F103-24

Individual Consideration Agenda

Comment 1:

IFC: 903.2.8.5; IBC: [F] 903.2.8.5

Proponents: Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane. Buildings that do not contain more than two *dwelling units* ~~Group R-3 occupancies referenced in Table 504.4 of the *International Building Code*~~ shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

2024 International Building Code

Revise as follows:

[F] 903.2.8.5 Group R-3 occupancies 4 stories or less above grade plane. Buildings that do not contain more than two *dwelling units* ~~Group R-3 occupancies referenced in Table 504.4~~ shall be permitted to install an *automatic sprinkler system* in accordance with Section 903.3.1.3 when the number of stories above grade plane does not exceed 4.

Reason: The committee may not have understood the proposal because the proponent was unable to present in person. Their reasoning for disapproval was " A Group R-3 occupancy may be a one- and two-family dwelling and be outside the scope of NFPA13D."

They have this wrong. NFPA 13D scoping is as follows: "This standard shall cover the design, installation, and maintenance of automatic sprinkler systems for protection against the fire hazards in one- and two-family dwellings, manufactured homes, and townhouses. "When a one-and two-family dwelling or townhouse falls out of the scoping of the International Residential Code because it is 4 stories, it then is a Group R-3 occupancy under the International Building Code. This one or two family dwelling or townhouse should be allowed to be built to 4 stories or 60 feet in height without having to change the automatic fire sprinkler system from a NFPA13D to 13R which is required per Table 503.4 and 503.4 of the IBC.I have clarified with the language change that only buildings with no more than two dwelling units and are Group R-3 from the IBC are allowed to use NFPA 13D sprinkler systems. The second reason the committee stated for disapproval was "There was also concern that the not exceeding 60 feet might be too low or a bad limitation."

I would agree that if NFPA 13D does not have a height or story restriction, then why limit it to 60 feet?

Please reconsider this cost saving proposal to allow a NFPA 13D in lieu of a NFPA 13R system as required in Tables 503.4 and 503.4 of the IBC for *Buildings* that do not contain more than two *dwelling units.*

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Decrease the labor and material costs

Estimated Immediate Cost Impact Justification (methodology and variables):

Less labor and materials for a NFPA 13D verse a NFPA 13R system

F108-24

IFC: SECTION 903, 903.2, 903.2.10.3 (New); IBC: SECTION 903, [F] 903.2, 903.2.10.3 (New)

Proposed Change as Submitted

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

903.2 Where required. *Approved automatic sprinkler systems* in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12. **Exception:** Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 of the International Building Code or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, or both.

Add new text as follows:

903.2.10.3 Lithium-ion or lithium metal powered vehicles.. An *approved automatic sprinkler system* shall be provided throughout fire areas used for the parking or storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

2024 International Building Code

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.2 Where required. *Approved automatic sprinkler systems* in new *buildings* and *structures* shall be provided in the locations described in Sections 903.2.1 through 903.2.12. **Exception:** Spaces or areas in telecommunications *buildings* used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an *automatic sprinkler system* by Section 1207 of the *International Fire Code* for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an *automatic smoke detection system* in accordance with Section 907.2 and are separated from the remainder of the *building* by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

Add new text as follows:

903.2.10.3 Lithium-ion or lithium metal powered vehicles . An *approved automatic sprinkler system* shall be provided throughout fire areas used for the parking or storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

Reason: Last cycle the hazards presented by lithium-ion or lithium metal battery powered vehicle s was addressed by adding the following two sections to the IFC and IBC.

903.2.9 Group S-1.

5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square

feet (46.4 m2).

902.2.9.1 Repair garages.

5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m2).

The hazard addressed is the same when located in a Group S-2 parking garage. This proposal uses the previously approved language to add the protection to S-2 parking garages for consistency.

It should be noted that NFPA 88A: Standard for Parking Structures, 2023, requires all parking garages to be protected by an automatic fire sprinkler system installed in accordance with NFPA 13.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This proposal would require the same protection for S-2 parking garages that is required for S-1 occupancies currently. It will increase new construction costs of S-2 parking garages. The exact cost cannot be estimated but $4 per square foot can be used.

Estimated Immediate Cost Impact Justification (methodology and variables):

To provide an exact cost a set of detailed plans for the installation of the automatic sprinkler system in a given parking structure is necessary, then the unit costs for all of the parts required including manhours would need to be calculated for a given cost region, then a cost multiplier would need to be added or subtracted for every other cost region where the I-Codes are applied.

F108-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that it provides consistency in the sprinkler requirements for parking garages. (Vote: 8-5)

F108-24

Individual Consideration Agenda

Comment 1:

Proponents: Steven Rosenstock, Edison Electric Institute, Edison Electric Institute (srosenstock@eei.org); Genevieve Cullen, Electric Drive Transportation Association (EDTA), EDTA (gcullen@electricdrive.org); Emily Kelly, ChargePoint (emily.kelly@chargepoint.com); Rick Tempchin, Alliance for Transportation Electrification (rick@evtransportationalliance.org); Tessa Sanchez, Tesla, Tesla, Inc. (tesanchez@tesla.com) requests Disapproved

Reason: In the IBC, S-2 facilities include “public parking garages, open or enclosed” and the category covers “Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in

paper cartons with or without single thickness divisions; or in paper wrappings." (source: ICC website at https://codes.iccsafe.org/s/CABC2022P1/chapter-3-occupancy-classification-and-use/CABC2022P1-Ch03-Sec311.3).

In public parking garages, lithium-ion vehicles are likely to be parked next to gasoline or diesel vehicles. Only in garages with multiple EV charging stations all next to each other serving the same row of parking will lithium-ion vehicles possibly be parked. For a public parking garage without EV charging stations, it will not be known where EV's will be parked.

Also, not all EV's will have lithium-ion batteries. Some include nickel-metal hydride batteries, while other vehicles use Lithium-Iron Phosphate (LFP) batteries or sodium-ion batteries. There are car companies working on developing solid-state batteries for EV in the near future.

Also, as the proponent stated, the 2023 edition of NFPA88A already contains "New requirements pertaining to emergency plans, pre-incident planning, mixing fans, and sprinklers". (source: https://www.nfpa.org/product/nfpa-88a-standard/p0088acode#2023-edition-details).

Also, according to the National Fire Sprinkler Association (https://nfsa.org/2024/04/30/fire-protection-for-parking-garages/).

"The 2023 NFPA 88A Standard for Parking Structures Section 6.4.1 now requires all new parking structures to be fully protected with fire sprinklers. This would include both open and closed structures regardless of size but does not affect existing parking structures already built.

What Does the NFPA 1 Fire Code Say About Fire Protection for Parking Garages?

The 2024 edition of NFPA 1 Fire Code Section 29.1.2 and the 2024 NFPA 101 Life Safety Code Section 42.8.3.5 both require all new parking garages to be fully sprinklered without any exception to size while once again not affecting existing structures."

In other words, all new parking garages, regardless of the type of vehicle that is parked or stored, have to install sprinklers.

This proposal could cause confusion, since it implies that only vehicles with lithium-ion vehicles have to have sprinklers.

Therefore, this language is not needed and should be disapproved.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 416

F110-24

IFC: 903.3.1.1.2; IBC: [F] 903.3.1.1.2

Proposed Change as Submitted

Proponents: Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org)

2024 International Fire Code

Revise as follows:

903.3.1.1.2 Bathrooms. In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that wall~~s~~ and ceiling~~s~~ coverings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible ~~or limited-combustible~~ materialsin accordance with Section 703.3.1 of the I*nternational Building Code* and providing ~~with~~ a 15-minute thermal barrier rating.

2024 International Building Code

Revise as follows:

[F] 903.3.1.1.2 Bathrooms. In Group R occupancies sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that walls and ceilings, including the wall~~s~~ and ceiling~~s~~ coverings behind a shower enclosure or tub, are of noncombustible ~~or limited-combustible~~ materials in accordance with Section 703.3.1 and providing ~~with~~ a 15-minute thermal barrier rating.

Reason: The current IBC/IFC text is nearly identical to the requirement in found in NFPA 13. This proposal adjusts the intent of the text from NFPA 13 in the IBC/IFC and removes the term limited combustible, as it is not defined in the IBC/IFC (or the family of ICC codes) but is incorporated into IBC Section 703.3.1.

This change is important because the construction type in NFPA 13 is different than the type of construction in the IBC/IFC. NFPA 13 construction type addresses the protected space as the type of construction, for example, as combustible, noncombustible or limited-combustible, whereas the IBC type of construction addresses the structural components of the building as combustible or noncombustible (per 703.3.1). Currently, without this change, a literal read of this section would require the wall and ceiling construction to be entirely noncombustible, i.e., steel studs steel bar joists, concrete plank, etc.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Source: Actual estimates and RS Means.

Noncombustible wall, 3 5/8 in steel stud, 16 in oc, 5/8 in. Type X each side: $4.33 - $4.40 sf

Combustible wall, 3 ½ in. wood stud, 16 in oc, 5/8 in. Type X, each side: $5.34 - $6.25 sf

Estimated Immediate Cost Impact Justification (methodology and variables):

Analogous methodology using actual current cost estimates and data from RS Means to create a range of cost for combustible and noncombustible walls. This proposal does lower the cost of construction as it clarifies the bathroom walls enclosing of the tub/shower unit can match the type of construction, such as Type V, with drywall versus constructing a totally noncombustible wall behind the tub/shower unit.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason:
The committee stated that the reason for the disapproval of the proposal was that it was identified by the proponent and others in testimony that it needed additional revisions. It was expected to be followed up with further revisions for the second committee action hearing. (Vote: 13-0)

F110-24

Individual Consideration Agenda

Comment 1:

IFC: 903.3.1.1.2, NFPA Chapter 80 (New); IBC: [F] 903.3.1.1.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Jeffrey M Hugo, CBO, NFSA, National Fire Sprinkler Association (hugo@nfsa.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

903.3.1.1.2 Bathrooms. In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual *dwelling units* or *sleeping units*, provided that wall and ceiling coverings, including the walls and ceilings behind a shower enclosure or tub, ~~are of noncombustible materials in accordance with Section 703.3.1 of the *International Building Code* and providing a 15-minute thermal barrier rating.~~ are sheathed with one of the following:

1. A noncombustible material complying with Section 703.3.1 of the *International Building Code*.
2. An approved 15-minute thermal barrier that has been tested in accordance with and has met the acceptance criteria of both the temperature transmission fire test and the integrity fire test of NFPA 275.
3. 1/2-inch (12.7 mm) *gypsum wallboard.*

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

275—22 Standard Method of Fire Tests for the Evaluation of Thermal Barriers

2024 International Building Code

[F] 903.3.1.1.2 Bathrooms. In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m2) in area and are located within individual *dwelling units* or *sleeping units*, provided that wall and ceiling coverings, including the walls and ceilings behind a shower enclosure or tub, ~~are of noncombustible materials in accordance with Section 703.3.1 of the *International Building Code* and providing a 15-minute thermal barrier rating.~~ are sheathed with one of the following:

1. A noncombustible material complying with Section 703.3.1.

2. An approved 15-minute thermal barrier that has been tested in accordance with and has met the acceptance criteria of both the temperature transmission fire test and the integrity fire test of NFPA 275.

3. 1/2-inch (12.7 mm) *gypsum wallboard*.

Reason: The current IBC/IFC text is nearly identical to the requirement in found in NFPA 13. This comment adjusts the intent of the text from NFPA 13 in the IBC/IFC and removes the term limited combustible, as it is not defined in the IBC/IFC (or the family of ICC codes) but is indirectly associated with the exception in IBC Section 703.3.1.

This change is important because the construction type in NFPA 13 is different than the type of construction in the IBC/IFC. NFPA 13 construction type addresses the protected space as the type of construction, for example, as combustible, noncombustible or limited-combustible, whereas the IBC type of construction addresses the structural components of the building as combustible or noncombustible (per 703.3.1). Currently, without this change, a literal read of this section would require the wall and ceiling construction to be entirely noncombustible, i.e., steel studs steel bar joists, concrete plank, etc.

The intent of the section is to permit materials (either noncombustible or complying with the thermal barrier criteria, with the original intent being to use gypsum wallboard) that are adequate to eliminate the need for sprinklers. In order to allow this sprinkler exception, the material needs to be applied to the studs before the tub and shower enclosure installation.

Note that the section was intending to refer to a thermal barrier (see IBC section 2603.4), which does not provide a "rating" but provides protection for 15 minutes because NFPA 275 requires the material to pass 2 tests, both of which are conducted for 15 minutes: NFPA 286 and a test based on the ASTM E119 time-temperature curve.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

see information with original proposal

Estimated Immediate Cost Impact Justification (methodology and variables):

see original proposal

Comment (CAH2)# 314

F111-24

IFC: 903.3.1.1.3; IBC: [F] 903.3.1.1.3

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Revise as follows:

903.3.1.1.3 Lithium-Ion or lithium metal batteries. Where *automatic sprinkler systems* are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an approved testing laboratory ~~involving test scenarios.~~ A report prepared by a registered design professional with expertise in fire protection engineering shall be provided to the fire code official for review and approval in accordance with Section 104.2.2 and shall that address the range of variables associated with the intended arrangement of the hazards to be protected.

2024 International Building Code

Revise as follows:

[F] 903.3.1.1.3 Lithium-ion or lithium metal batteries. Where *automatic sprinkler systems* are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an *approved* testing laboratory ~~involving test scenarios that~~ . A report prepared by a registered design professional with expertise in fire protection engineering shall be provided to the fire code official for review and approval in accordance with Section 104.2.2 and shall address the range of variables associated with the intended arrangement of the hazards to be protected.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

There currently is a lack of full-size testing of battery arrangements in buildings. This leads to difficulties for the designer, builder and code official. There is design guidance from an approved laboratory based upon some large-scale burn testing, Factory Mutual, on sprinkler design and there are lab reports for many cells and/or modules that a designer could utilize in determining the correct level of sprinkler protection. This modification would provide for use of the information available provided a report prepared by a registered design professional with expertise in fire protection engineering is submitted for review and approval.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal may reduce the cost of construction as it allows other ways of justifying performance where no testing data exists.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reasons for the approval of the proposal were: It provides a good reminder because of the lack of guidance out there for the sprinkler protection criteria and typically for the storage of lithium-ion batteries alternate methods are used with jurisdictions. While there is no testing data there are also not really good methods to extend the module level test out, so that is almost as inaccurate as the testing data, but there is nothing better right now. (Vote: 14-0)

F111-24

Individual Consideration Agenda

Comment 1:

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Self (jm@klausbruckner.com) requests Disapproved

Reason: We keep increasing the quantities and decreasing the requirements for lithium battery storage/use in the codes, without any sprinkler testing or justification. In the meantime, more lithium fires (some fatal) are occurring throughout the country. This is highly unprecedented. A fire in an energy storage system facility in San Diego in May took nearly 17 days to control and put out. There is no analysis a design profession can perform for a scenario such as this. There is no justification for the sprinkler criteria anyone can specify, design professional or otherwise, without actual testing.

The proponents suggest that a design professional can gather data and address fire sprinkler system criteria using FM Data Sheets. FM Data Sheet 5-33 only addresses Energy Storage Systems and not all lithium battery storage and use scenarios (e.g. batteries stacked high in manufacturing of cars, electric bikes in a retail store, etc.). Additionally, FM Data Sheet 5-33 states:

"*Provide automatic sprinkler protection designed to a 0.3 gpm/ft2 over 2500 ft2 or the room area, whichever is larger, with an additional allowance of 250 gal/min for hose stream.*"

The above is the only sprinkler criteria found for energy storage systems. The Data Sheet provides the following additional explanation:

"Limited research has been performed on lithium ion-based ESS systems to assess fire propagation characteristics and protection schemes. The report Development of Sprinkler Protection Guidance for Lithium Ion Based Energy Storage Systems, published in June 2019 on the FM Global Website, is the basis for recommendations on fire protection and separation distances from both noncombustible and combustible materials. However, it must be recognized that the research was limited in scope, and the effect of rack design, materials-of-construction, battery specifications and chemistry, and other design features are not well understood. Because of these issues, it does not appear possible to extrapolate the results obtained with the tested lithium iron phosphate (LFP) and Li-nickel manganese cobalt oxide (NMC) systems to other ESS. The recommendations in DS 5-33 represent the current state of knowledge. The data sheet will be updated as additional information is available."

Implying that a registered design professional can address sprinkler criteria without testing is highly inappropriate and misleading. Putting on the impossible decision of what is appropriate for these scenarios on the shoulders of design professionals, subjects the design professional to high liability. Additionally, under cost impact, the proponents state that this change allows other ways of justifying performance where no test data exists. In reality, by approving this code change, we are effectively discouraging manufacturers to run full scale testing on their lithium battery products, when test data is very much needed.

Bibliography: FM Data Sheet 5-33 [2020Ed.], Factory Mutual,, FM Global.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

F116-24

IFC: 904.3.5; IBC: [F] 904.3.5

Proposed Change as Submitted

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association

2024 International Fire Code

Revise as follows:

904.3.5 Monitoring. Where a building *fire alarm system* or a dedicated function fire alarm system is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* or dedicated function fire alarm system in accordance with NFPA 72.

2024 International Building Code

Revise as follows:

[F] 904.3.5 Monitoring. Where a building *fire alarm system* or a dedicated function fire alarm system is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* or dedicated function fire alarm system in accordance with NFPA 72.

Reason: A proposal to require pre-engineered fire extinguishing systems and other alternative automatic fire-extinguishing systems to be connected to a Dedicated Function fire alarm system when the building does not have a fire alarm system installed. Currently, the IFC only requires automatic fire-extinguishing systems to be monitored by a building fire alarm system.

Some agencies have interpreted that a dedicated function fire alarm system meets the requirement for a building fire alarm system. IFC Section 202 has the following definition for a fire alarm system:

FIRE ALARM SYSTEM.

A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

NFPA 72, 2022 edition has the following definition for a fire alarm system and a building fire alarm system:

3.3.118 Fire Alarm System.

A system or portion of a combination system that consists of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals. (SIG-FUN)

3.3.118.4.1 Building Fire Alarm System.

A protected premises fire alarm system that includes any of the features identified in 23.3.3.1 and that serves the general fire alarm needs of a building or buildings and provides notification. (SIG-PRO)

With NFPA 72 providing a definition for a building fire alarm system, I believe it is the current intent of the IFC to not require a Dedicated Function fire alarm system to monitor a pre-engineered fire extinguishing system, or other alternative automatic fire-extinguishing system. This proposal would clarify the requirement for monitoring of automatic fire extinguishing systems. In most cases, automatic fire extinguishing systems activate prior to activation for the sprinkler system. A pre-engineered fire extinguishing system protecting a commercial kitchen hood activates when the hood system senses fire, prior to, and often without activation of the sprinkler system. When

the automatic fire extinguishing system is monitored, there would be earlier notification to the fire department.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The proposal could have an increase in construction cost for installation of a dedicated function fire alarm system. If the automatic fire extinguishing system is located near the fire alarm control unit or the fire alarm system initiating circuit wiring, there would be no significant cost impact. An example of increased cost would be a strip mall, where the automatic fire extinguishing system is located at one end of the strip mall and the fire alarm control unit is located at the other end. In this case, a 5% increase in system cost could be expected.

Based upon a $1.00-$3.00 estimate from Chat GPT this would increase by $0.05 to $0.15 per sq ft.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal could have an increased system cost of approximately 5% for the installation of additional fire alarm initiating device circuit wiring to the automatic fire extinguishing system.

Estimated Life Cycle Cost Impact:

There is not estimated additional life cycle cost for this proposal.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

There is not estimated additional life cycle cost for this proposal.

F116-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **Disapproved**

Committee Reason: The committee stated the reasons for the disapproval of the proposal were: It gives a bad option. If you do have a building fire alarm and a dedicated functional fire alarm you are actually permitted to monitor them separately, and that is not the intent. NFPA 72 covers dedicated function fire alarm systems, and it is referenced there, and also it is not a defined term in the IFC. (Vote: 14-0)

F116-24

Individual Consideration Agenda

Comment 1:

IFC: 904.3.5, 904.3.5.1 (New); IBC: [F] 904.3.5, [F] 904.3.5.1 (New)

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

904.3.5 Monitoring. Where a building *fire alarm system* ~~or a dedicated function fire alarm system~~ is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* ~~or dedicated function fire alarm system~~ in accordance with NFPA 72.

Add new text as follows:

904.3.5.1 Alternative automatic fire extinguishing systems. Where a dedicated function fire alarm system is installed, alternative automatic fire-extinguishing systems shall be monitored by the dedicated function fire alarm system in accordance with NFPA 72.

2024 International Building Code

[F] 904.3.5 Monitoring. Where a building *fire alarm system* ~~or a dedicated function fire alarm system~~ is installed, *automatic fire-extinguishing systems* shall be monitored by the building *fire alarm system* ~~or dedicated function fire alarm system~~ in accordance with NFPA 72.

Add new text as follows:

[F] 904.3.5.1 Alternative automatic fire extinguishing systems. Where a dedicated function fire alarm system is installed, alternative automatic fire-extinguishing systems shall be monitored by the dedicated function fire alarm system in accordance with NFPA 72.

Reason: During the 1st Committee Hearing in Orlando, The Committee expressed concern that the code proposal would require a separate fire alarm system for the alternative automatic fire extinguishing system monitoring. This revised proposal identifies a separate code requirement when a building only has a dedicated function fire alarm system monitoring the fire sprinkler system to also monitor the alternative automatic fire extinguishing system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The revised proposal provides clarification for the initial proposal, there is no increase or decrease in construction costs from the initial proposal.

Comment (CAH2)# 179

F117-24

IFC: 904.7, 904.7.1 (New), 904.7.1, 904.7.3 (New); IBC: [F] 904.7, [F] 904.7.1 (New)

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

904.7 Foam systems. Foam-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 11 and their listing. Records of inspections and testing shall be maintained.

Add new text as follows:

904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall not contain intentionally-added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS).

Revise as follows:

~~**904.7.1**~~ **904.7.2 System test.** Foam-extinguishing systems shall be inspected and tested at intervals in accordance with NFPA 25.

Add new text as follows:

904.7.3 Existing foam systems. Existing supplies of firefighting foam containing PFAS shall be replaced with a foam concentrate type complying with Section 904.7.1 based on the following schedule, whichever occurs first:

1. The tank containing AFFF is due for a hydrostatic test in accordance with Section 11.3.5 of NFPA 25.
2. The foam concentrate fails the annual quality condition test required in Section 11.3.1.1 of NFPA 25. The owner shall notify the fire code official after a failed quality condition test and establish a timeframe for replacement foam concentrate and necessary components that is acceptable to the fire code official.

2024 International Building Code

[F] 904.7 Foam systems. *Foam-extinguishing systems* shall be installed, maintained, periodically inspected and tested in accordance with NFPA 11 and their listing. Records of inspections and testing shall be maintained.

Add new text as follows:

[F] 904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall not contain intentionally-added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS).

Reason: Aqueous film-forming foam concentrates (AFFF) contain PFAS (polyfluoroalkyl substances or perfluoroalkyl substances). PFAS is referred to as a “forever chemical”, and U.S. EPA has determined that exposure to PFAS can have detrimental health effects. To address this situation, this proposal is one of three code changes addressing AFFF in fire-extinguishing systems.

Thousands of existing foam fire-extinguishing systems exist across the country. EPA and some states have already taken actions to remove or reduce materials containing PFAS that could present an exposure. This proposal is designed to replace the current AFFF supplies, and have the foam concentrate supply replaced with a nonfluorinated foam concentrate.

Section 904.7.2 is added to the code to specify that the type of foam concentrate must be in accordance with NFPA 11 and must not contain any intentionally added PFAS. The 2021 edition of NFPA 11 now includes criteria for protection with nonfluorinated foam.

Section 904.7.3 is added to set a trigger replacement of existing AFFF foam concentrate supplies with a nonfluorinated foam supply. Along with the items listed in Section 904.7.2, EPA and states may specify a certain date for replacement. The items listed in Section 904.7.2 represent occurrences in the life of the foam-extinguishing system. When either of these situations occur, it is time to replace the foam concentrate supply. This section refers back to Section 904.7.2 for approval of the type of foam concentrate used as the new supply.

Replacement with the newer nonfluorinated foam concentrates is not a simple swap of tank contents—much or all of the existing system equipment and piping may need to be replaced. Usually, the quantity of foam will increase resulting in the need for a larger supply and tank. Often, the foam-water sprinklers or nozzles need to be replaced for this new concentrate. Nonfluorinated foam concentrates are typically more viscous than AFFF, so a different eductor or foam pump is required. With all of this time, work, supplies of concentrate and equipment needed, it is not possible to replace all of these systems in a short time. It is not uncommon for a single facility to have thousands of gallons of product ready for system activation, and another stock of AFFF for replenishment after system activation.

Item 1 states that when the AFFF bladder tank is due for hydrostatic testing, the foam is to be replaced. The requirement for testing is every ten years. During hydrostatic testing, the foam concentrate is removed from the tank presenting an obvious opportunity to refill the tank with nonfluorinated foam. The date for hydrostatic retesting is known years in advance. This advance notice provides time to determine what other components of the extinguishing system must also be replaced, with the intent to ensure a minimal down time.

Item 2 states that when the foam concentrate fails the annual quality condition testing, it shall be replaced. The real-world practice when the foam concentrate fails the quality condition test is to test it again. Once it is confirmed that the concentrate has failed, the next step is to establish a plan for replacement. At this point, the fire code official is involved in determining the timeframe for replacement. There have been incidents where foam, that has failed the quality condition testing, has successfully controlled and extinguished a fire. The decision on the urgency should be based on whether quality condition tests have been completed annually and what portion of the piping and appurtenances must be replaced at the same time the foam is replaced. This will allow the transition to nonfluorinated foam to occur with the least down time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This proposal does not increase the cost of construction, but it will increase the cost of maintenance of an existing AFFF system. U.S. EPA has placed a ban on use of AFFF for new installations and many manufacturers are no longer producing AFFF.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate for construction costs is for little change in cost. An internet search on January 8, 2023 found the following product costs:

1. Chemguard 3%/6% AR-AFFF 5 gallons at $266.95
2. Chemguard 3%/3% AR-NFFF 5 gallons at $266.48

It is obvious that the cost of the product will have little impact.

The increase on maintenance costs could be significant depending on the size of the system, and whether the existing piping network needs to be replaced. There are too many variables to develop an accurate estimate.

F117-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: This is a big concern, but it should be handled on the state or EPA level. It is not the position of the fire code to regulate environmental substances. The time frame is problematic. It is being adjusted on the local level, and there are probably a lot more things that need to be done when you replace these

systems. There is no foam for big tank fires now. (Vote: 13-0)

F117-24

Individual Consideration Agenda

Comment 1:

IFC: 904.7.1, 904.7.2, 904.7.2.1 (New), 904.7.3; IBC: [F] 904.7.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall ~~not contain intentionally added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS)~~be approved by the fire code official and the fire chief.

904.7.2 System test. Foam-extinguishing systems shall be inspected and tested at intervals in accordance with NFPA 25.

Add new text as follows:

904.7.2.1 Foam concentrate test. Where the foam concentrate supply fails the annual quality condition test required in Section 11.3.1.1 of NFPA 25, the owner shall notify the fire code official. The foam concentrate shall be replaced in a manner approved by the fire code official and the fire chief.

Delete without substitution:

~~**904.7.3 Existing foam systems.** Existing supplies of firefighting foam containing PFAS shall be replaced with a foam concentrate type complying with Section 904.7.1 based on the following schedule, whichever occurs first:~~

1. ~~The tank containing AFFF is due for a hydrostatic test in accordance with Section 11.3.5 of NFPA 25.~~
2. ~~The foam concentrate fails the annual quality condition test required in Section 11.3.1.1 of NFPA 25. The owner shall notify the fire code official after a failed quality condition test and establish a timeframe for replacement foam concentrate and necessary components that is acceptable to the fire code official.~~

2024 International Building Code

Revise as follows:

[F] 904.7.1 Foam concentrate type. The foam concentrate type utilized in foam-extinguishing systems shall be in accordance with NFPA 11 and shall ~~not contain intentionally added polyfluoroalkyl substances or perfluoroalkyl substances (PFAS)~~be approved by the fire code official and the fire chief.

Reason: This item was Disapproved at CAH 1. This comment has been revised based on comments received at CAH 1.

This comment simplifies the proposal and ensures that the proper officials are involved in the selection and replacement of foam concentrate. Section 904.7.2 is revised to require that the foam concentrate must be approved by the code official and the fire chief. There are certain times when the fire chief needs to be involved; this is one of those times, because the fire department will be using the foam concentrate during firefighting operations.

There was also a concern about the replacement of existing systems. It is true that there is not yet a straight exchange foam concentrate for AFFF. Therefore, when the foam concentrate is replaced, typical some or most of the piping and appurtenances must be replaced also. Section 904.7.3 is deleted and in its place Section 904.7.2.1 is inserted. Section 904.7.2.1 states that when the foam concentrate fails the annual quality assurance test, that the code official is notified. The code does not state what the resolution is to be, rather it states that whatever the resolution is it must be approved by the fire code official and the fire chief.

The resolution could be to replace establish a plan for replacement of the system and transition to a new foam concentrate; or other alternate temporary solutions. But the code official and fire chief will be involved in that decision.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal does not increase the cost of construction, but it will increase the cost of maintenance of an existing AFFF system. U.S. EPA has placed a ban on use of AFFF for new installations and most manufacturers are no longer producing AFFF.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate for construction costs is for little change in cost. An internet search on January 8, 2023 found the following product costs:

1. Chemguard 3%/6% AR-AFFF 5 gallons at $266.95
2. Chemguard 3%/3% AR-NFFF 5 gallons at $266.48

It is obvious that the cost of the product will have little impact.
The increase on maintenance costs could be significant depending on the size of the system, and whether the existing piping network needs to be replaced. There are too many variables to develop an accurate estimate.

Comment (CAH2)# 558

F152-24

IFC: (New), SECTION 202 (New), SECTION 918 (New), 918.1 (New), 918.2 (New), 918.2.1 (New), 918.2.1.2 (New), 918.2.1.3 (New), 918.3 (New), 918.3.1 (New), 918.3.1.1 (New), 918.3.1.2 (New), 918.3.1.3 (New), 918.3.2 (New), 918.3.2.1 (New), 918.3.2.2 (New), 918.3.2.3 (New), 918.4 (New), NFPA Chapter 80 (New), UL Chapter 80 (New); IBC: SECTION 202 (New), SECTION 918 (New), [F] 918.1 (New), [F] 918.2 (New), [F] 918.2.1 (New), [F] 918.2.1.2 (New), [F] 918.2.1.3 (New), [F] 918.3 (New), [F] 918.3.1 (New), [F] 918.3.1.1 (New), [F] 918.3.1.2 (New), [F] 918.3.1.3 (New), [F] 918.3.2 (New), [F] 918.3.2.1 (New), [F] 918.3.2.2 (New), [F] 918.3.2.3 (New), [F] 918.4 (New), NFPA Chapter 35 (New), UL Chapter 35 (New)

Proposed Change as Submitted

Proponents: Rick Trieste, Consolidated Edison Company of New York, Consolidated Edison Company of New York (triester@coned.com)

2024 International Fire Code

Add new definition as follows:

FUEL GAS ALARM . A single- or multiple-station alarm intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control unit and is part of a fuel gas detection system.

FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

FUEL-GAS SOURCE. Any combustion equipment that utilizes a gas that, when combined with an oxidizer (typically air or oxygen), could be burned to produce thermal energy. Examples of fuel gases include, but are not limited to, natural gas, methane, or liquefied petroleum gases (LP-Gas) such as propane and butane.

Add new text as follows:

SECTION 918
FUEL-GAS DETECTION

918.1 General. New and existing buildings shall be provided with fuel-gas detection in accordance with Section 918.

918.2 Where required. Fuel-gas detection shall be provided in Group R occupancies that are served by a fuel-gas source.

918.2.1 Dwelling units and sleeping units. Fuel-gas detection for *dwelling units* and *sleeping units* shall comply with Sections 918.2.1.2 and 918.2.1.3.

918.2.1.2 Fuel-Gas source. Where a *fuel-gas source* is located outside of a bedroom or sleeping room, fuel-gas detection shall be installed in *dwelling units* and *sleeping units* either outside of each separate sleeping area in the immediate vicinity of the bedrooms or sleeping room or within each bedroom or sleeping room. Where a fuel-gas source is located within a bedroom or sleeping room, or a bathroom attached to either, fuel-gas detection shall be installed within the bedroom or sleeping room.

918.2.1.3 Environmental limitations for detection devices. Where environmental conditions in an enclosed room or space are incompatible with fuel-gas detection devices, fuel-gas detection shall be provided in an approved adjacent location.

918.3 Detection devices. Fuel-gas detection shall be provided by fuel-gas alarms complying with Section 918.3.1 or a fuel-gas detection system complying with Section 918.3.2.

918.3.1 Fuel-gas alarms. Fuel-gas alarms complying with Sections 918.3.1 through 918.3.1.3 and installed in accordance with NFPA 715 and the manufacturer's instructions shall be provided in either of the following:

1. In dwelling units and sleeping units in accordance with 918.2.1.
2. In normally occupied locations other than dwelling units or sleeping units, where approved by the fire code official and the manufacturer's instructions, fuel-gas alarms shall be annunciated by an audible and visual signal in an approved location.

918.3.1.1 Power source. Fuel-gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be provided with a battery backup. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection. **Exception:** Fuel-gas alarms shall be permitted to be battery powered in buildings without a power source.

918.3.1.2 Listings. Fuel-gas alarms shall be listed in accordance with UL 1484.

918.3.1.3 Interconnection. Where more than one fuel-gas alarm is installed, actuation of any alarm shall cause all alarms to signal an alarm condition.

918.3.2 Fuel-gas detection systems. Fuel-gas detection systems shall be installed in accordance with NFPA 715 and the manufacturer's instructions.

918.3.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is provided, fuel-gas detection shall be provided by connecting fuel-gas detectors to the fire alarm system.

918.3.2.2 Listings. Fuel-gas detectors shall be listed in accordance with UL 2075.

918.3.2.3 Alarm notification. Activation of a fuel-gas detector shall initiate audible and visible alarm notification throughout the building and annunciate the alarm signal at the control unit. **Exception:** Notification shall be permitted to be limited to the area where the fuel-gas alarm signal originated and other signaling zones specified in an approved fire safety plan, provided that an approved on-site or off-site location is automatically notified.

918.4 Maintenance. Fuel-gas alarms and fuel-gas detection systems shall be maintained in accordance with NFPA 715 and the manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2023	Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2022	Residential Gas Detectors

2024 International Building Code

Add new definition as follows:

[F] FUEL GAS ALARM. A single- or multiple-station alarm intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

[F] FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control

unit and is part of a fuel gas detection system.

[F] FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

[F] FUEL-GAS SOURCE. Any combustion equipment that utilizes a gas that, when combined with an oxidizer (typically air or oxygen), could be burned to produce thermal energy. Examples of fuel gases include, but are not limited to, natural gas, methane, or liquefied petroleum gases (LP-Gas) such as propane and butane.

Add new text as follows:

SECTION 918
FUEL-GAS DETECTION

[F] 918.1 General. New and existing buildings shall be provided with fuel-gas detection in accordance with Section 918.

[F] 918.2 Where required. Fuel-gas detection shall be provided in Group R occupancies that are served by a fuel-gas source.

[F] 918.2.1 Dwelling units and sleeping units. Fuel-gas detection for *dwelling units* and *sleeping units* shall comply with Sections 918.2.1.2 and 918.2.1.3.

[F] 918.2.1.2 Fuel-Gas source. Where a *fuel-gas source* is located outside of a bedroom or sleeping room, fuel-gas detection shall be installed in *dwelling units* and *sleeping units* either outside of each separate sleeping area in the immediate vicinity of the bedrooms or sleeping room or within each bedroom or sleeping room. Where a fuel-gas source is located within a bedroom or sleeping room, or a bathroom attached to either, fuel-gas detection shall be installed within the bedroom or sleeping room.

[F] 918.2.1.3 Environmental limitations for detection devices. Where environmental conditions in an enclosed room or space are incompatible with fuel-gas detection devices, fuel-gas detection shall be provided in an approved adjacent location.

[F] 918.3 Detection devices. Fuel-gas detection shall be provided by fuel-gas alarms complying with Section 918.3.1 or a fuel-gas detection system complying with Section 918.3.2.

[F] 918.3.1 Fuel-gas alarms. Fuel-gas alarms complying with Sections 918.3.1 through 918.3.1.3 and installed in accordance with NFPA 715 and the manufacturer's instructions shall be provided in either of the following:

1. In dwelling units and sleeping units in accordance with 918.2.1.
2. In normally occupied locations other than dwelling units or sleeping units, where approved by the fire code official and the manufacturer's instructions, fuel-gas alarms shall be annunciated by an audible and visual signal in an approved location.

[F] 918.3.1.1 Power source. Fuel-gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be provided with a battery backup. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection. **Exception:** Fuel-gas alarms shall be permitted to be battery powered in buildings without a power source.

[F] 918.3.1.2 Listings. Fuel-gas alarms shall be listed in accordance with UL 1484.

[F] 918.3.1.3 Interconnection. Where more than one fuel-gas alarm is installed, actuation of any alarm shall cause all alarms to signal an alarm condition.

[F] 918.3.2 Fuel-gas detection systems. Fuel-gas detection systems shall be installed in accordance with NFPA 715 and the manufacturer's instructions.

[F] 918.3.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is provided, fuel-gas detection shall be provided by connecting fuel-gas detectors to the fire alarm system.

[F] 918.3.2.2 Listings. Fuel-gas detectors shall be listed in accordance with UL 2075.

[F] 918.3.2.3 Alarm notification. Activation of a fuel-gas detector shall initiate audible and visible alarm notification throughout the building and annunciate the alarm signal at the control unit. **Exception:** Notification shall be permitted to be limited to the area where the fuel-gas alarm signal originated and other signaling zones specified in an approved fire safety plan, provided that an approved on-site or off-site location is automatically notified.

[F] 918.4 Maintenance. Fuel-gas alarms and fuel-gas detection systems shall be maintained in accordance with NFPA 715 and the manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2023 Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2022 Residential Gas Detectors

Reason: This Proposal seeks to protect occupants in Group-R occupancies from fires caused by natural gas or propane explosions or leaks. The proposal is in response to recommendation by the National Transportation Safety Board (NTSB) in NTSB Report NTSB/PAR-19/01 PB2019-100722 *Building Explosion and Fire Silver Spring, Maryland* that the ICC "….. requires methane detection systems for all types of residential occupancies with gas service." The recommendation by the NTSB is supported by a 2018 NFPA report, *Natural Gas and Propane Fires, Explosions and Leaks Estimates and Incidents - Marty Ahrens and Ben Evarts October 2018:*

- Between 2012 and 2016 an estimated average of 4,200 U.S. home structure fires per year started with the ignition of natural gas that caused an average of 40 deaths per year. The report classifies homes as one- and two-family homes, including manufactured homes, and apartments and other multi-family housing.
- Natural gas or LP-Gas leaks have generally been increasing since 2007

The requirements in this proposal are based on the 2023 edition of NFPA 715 standard, *Installation for Fuel Gas Detection and Warning Equipment*. The technical requirements in NFPA 715 were based on the Fire Protection Research Foundation (FPRF) report, *Combustible Gas Dispersion in Residential Occupancies and Detector Location Analysis.* The report studied combustible gas leaks and dispersion in residential buildings, as well as an analysis of combustible gas detector placement.

Con Edison recognizes the life-saving benefit of fuel gas detection devices and as such is installing gas detection devices in every building served with natural gas with over 275,000 devices in service to date of a program that will install about 375,000 devices. The in-service devices report all detection alarms wirelessly to the Company. The program is the US largest case study for safety benefit of fuel gas detection devices and has demonstrated the reliability of the technology and the safety benefit. The Company devices have detected multiple atmospheric natural gas readings that posed a risk of fire/explosion, which was avoided by an immediate action by first responders that arrive in under 5 minutes of first detection. New York City through its Local Law 157 requires natural gas detection devices in residential occupancies served with natural gas.

Additionally, this proposal is adding new definitions for fuel gas alarm, fuel gas detector and fuel gas detection system to clarify what is intended by these terms.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The installation of fuel gas detection as part of building construction is estimated to be approximately $500.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimated detector unit cost: $50 ea.

Estimated electric box/wiring installation cost based on NYC licensed electrical contractor cost when being installed as part of new construction or renovation: $120 ea.

Estimate based on three (3) wired detectors: One (1) unit by cooking appliances; one (1) unit by heating/clothes drying equipment; one (1) outside sleeping area as required in proposal.

Estimated cost of 3 units installed in 3 wired boxes: Approximately $500

F152-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason:
The committee stated that the reasons for the disapproval of the proposal were: The cost justification is not there to require these throughout all Group R occupancies. It is not ready to be demanded at that level. While there is going to be a potential for such protection, especially as systems age, the approach should be incremental for existing buildings. Instead of a blanket requirement to retroactively require there should be some sort of program such as when it is being sold or as rentals occur where protection is required.

The justification of cost versus the number of incidents. The words gas alarm and gas detector are used interchangeably but they are very different. The terminology needs to be clarified and additional justification for these requirements is needed. There is confusion about interconnection and then connection to an alarm and annunciate the alarm. There is going to be a lot that goes with this to educate people regarding the different signal of the gas detection versus from their carbon monoxide alarm or smoke alarm. What do you do when it goes off if it is just interconnected within the home?

There are a lot of unresolved issues. The reference to NFPA 715 may be appropriate. This is not something that is new. This has been around for a long time. There is data about incidents, but NFPA 715 is not complete yet. This is not an instance where we want to have the codes getting ahead of the standard, instead let the standard be finished first. It can be evaluated where they are and then decide if it is appropriate. This should be in the IFGC and not in the IFC and IBC. The proposal is lumping LP gas with natural gas and there are some inherent differences between those two gases. There are inherent safety benefits to natural gas. In the future, there may be a benefit if they are separated out in the statistics and look at these as two separate hazards. (Vote: 13-0)

F152-24

Individual Consideration Agenda

Comment 1:

IFC: (New), SECTION 202 (New), SECTION 918 (New), 918.1 (New), 918.2 (New), 918.2.1 (New), 918.2.1.2 (New), 918.2.1.3 (New), 918.3 (New), 918.3.1 (New), 918.3.1.1 (New), 918.3.1.2 (New), 918.3.1.3 (New), 918.3.2 (New), 918.3.2.1 (New), 918.3.2.2 (New), 918.3.2.3 (New), 918.4 (New), NFPA Chapter 80 (New), UL Chapter 80 (New); IBC: SECTION 202 (New), SECTION 918 (New), [F] 918.1 (New), [F] 918.2 (New), [F] 918.2.1

(New), [F] 918.2.1.2 (New), [F] 918.2.1.3 (New), [F] 918.3 (New), [F] 918.3.1 (New), [F] 918.3.1.1 (New), [F] 918.3.1.2 (New), [F] 918.3.1.3 (New), [F] 918.3.2 (New), [F] 918.3.2.1 (New), [F] 918.3.2.2 (New), [F] 918.3.2.3 (New), [F] 918.4 (New), NFPA Chapter 35 (New), UL Chapter 35 (New)

Proponents: Rick Trieste, Consolidated Edison Company of New York, Consolidated Edison Company of New York (triester@coned.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Add new definition as follows:

FUEL GAS ALARM . A single- or multiple-station alarm intended to detect fuel gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

FUEL GAS DETECTOR. A device with an integral sensor to detect fuel gas and transmit an alarm signal to a connected alarm control unit and is part of a fuel gas detection system.

FUEL GAS DETECTION SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fuel gas detectors and to initiate the appropriate response to those signals.

FUEL-GAS SOURCE. Any combustion equipment that utilizes a gas that, when combined with an oxidizer (typically air or oxygen), could be burned to produce thermal energy. Examples of fuel gases include, but are not limited to, natural gas, methane, or liquefied petroleum gases (LP-Gas) such as propane and butane.

Add new text as follows:

SECTION 918
FUEL-GAS DETECTION

918.1 General. Where required, fuel gas detection shall be installed in accordance with Section 918.

918.2 Where required. Fuel-gas detection shall be provided in Group R occupancies that are served by a fuel-gas source.

918.2.1 Dwelling units and sleeping units. Fuel-gas detection for *dwelling units* and *sleeping units* shall comply with Sections 918.2.1.2 and 918.2.1.3.

918.2.1.2 Fuel-Gas source. Where a *fuel-gas source* is located within a residential Group R building, but not in *dwelling units and sleeping units*, fuel-gas detection shall be installed in accordance with NFPA 715 or in accordance with an approved plan that complies with the manufacturer's instructions. Where a fuel-gas source is located within a dwelling unit or sleeping unit, or a bathroom attached to either, fuel-gas detection shall be installed within the dwelling unit or sleeping unit in accordance with NFPA 715

918.2.1.3 Environmental limitations for detection devices. Where a physical space or environmental conditions in an enclosed room or space are incompatible with fuel-gas detection devices, fuel-gas detection shall be provided in an approved adjacent location.

918.3 Detection devices. Fuel-gas detection shall be provided by fuel-gas alarms complying with Section 918.3.1 or a fuel-gas detection system complying with Section 918.3.2.

918.3.1 Fuel-gas alarms. Fuel-gas alarms shall be installed in accordance with NFPA 715 and the manufacturer's instructions shall be provided in either of the following:

1. In dwelling units and sleeping units in accordance with 918.2.1.

2. In normally occupied locations other than dwelling units or sleeping units, where required by the fire code official, fuel-gas alarms shall be annunciated by an audible and visual signal in an approved location and in accordance with the manufacturer's instructions.

918.3.1.1 Power source. Fuel-gas alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be provided with a battery backup. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection. **Exception:** Fuel-gas alarms shall be permitted to be battery powered in buildings without a power source.

918.3.1.2 Listings. Fuel-gas alarms shall be listed in accordance with UL 1484.

918.3.1.3 Interconnection. Where more than one fuel-gas alarm is installed, actuation of any alarm shall cause all alarms to signal an alarm condition.

918.3.2 Fuel-gas detection systems. Fuel-gas detection systems shall be installed in accordance with NFPA 715 or in accordance with an approved plan that complies with the manufacturer's instructions.

918.3.2.1 Fire alarm system integration. Where a building fire alarm system or combination fire alarm system, as defined in NFPA 72, is provided, fuel-gas detection shall be provided by connecting fuel-gas detectors to the fire alarm system.

918.3.2.2 Listings. Fuel-gas detectors shall be listed in accordance with UL 2075.

918.3.2.3 Alarm notification. Activation of a fuel-gas detector shall initiate audible and visible alarm notification throughout the building and annunciate the alarm signal at the control unit. **Exception:** Notification shall be permitted to be limited to the area where the fuel-gas alarm signal originated and other signaling zones specified in an approved fire safety plan, provided that an approved on-site or off-site location is automatically notified.

918.4 Maintenance. Where the maintenance of fuel-gas alarms and fuel-gas detection systems is required, they shall be maintained in accordance with NFPA 715 and the manufacturer's instructions.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

715-2023	Standard for the Installation of Fuel Gases Detection and Warning Equipment

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

1484-2022	Residential Gas Detectors

2024 International Building Code

Add the same as above.

Reason: This revised proposal provides guidance for AHJs who seek to utilize fuel gas detection as a life-saving device and limits installation to Group R new buildings as a starting point for consumer application with the ultimate need to ensure the safe distribution of a fuel gas being widescale consumer adoption in any occupancy that utilizes a fuel gas.

There are two companion proposals that add new definitions for fuel gas alarm, fuel gas detector and fuel gas detection system to clarify these terms. There is also a proposal that adds NFPA 715 Standard for the Installation of Fuel Gases Detection and Warning Equipment as a reference standard. Regarding NFPA 715, the standard is published and out in the public domain, has followed NFPA's standards-making process including input from stakeholders and the public, and has been approved by the Standards Council, and will continue to be revised on 3-year cycles.

Though the US Department of Transportation requires fuel gases to be odorized so as to be readily detectible by a normal sense of smell, the need to add a supplemental means of detection through devices is a new subject to the majority of society. Many in society simply do not understand the immediate urgency that is needed to respond to a gas odor or that a combustible level of a fuel gas can be present in a space without an odor due to odor fade issues. Simply, there is widescale lack of understanding of the safety issue posed by a leak rampant through society and opponents to their application of fuel gas detectors as life saving devices. This lack of understanding is evidenced by the multitude of fuel gas incidents that are the result from both consumer and contractor errors and fuel gas system failures.

Between the years of 2012 and 2016 local fire departments responded to an estimated 125,000 gas leaks (natural gas or LPG) per year in or on home properties. Home properties include one- and two-family homes, including manufactured homes and apartments and other multi-family housing. An estimated average of 4,200 home structure fires per year started with the ignition of natural gas. These fires caused an average of 40 deaths per year. The statistics, incident descriptions from NFPA publications (ref 1), and reports from the National Transportation Safety Board show that most major gas incidents involved some type of leak. Leaks or breaks in piping were the leading factors contributing to home structure fires per year that began with the ignition of natural gas. Cooking equipment was involved in 54% of the natural gas fires, and heating equipment, including water heaters, was involved in 25%. The report recognizes the data could not determine whether the source of the leak was from an inside pipe or outside pipe. That said, the location does not diminish the benefit of fuel gas detection installed per NFPA 715, whereas the standard requires a detection device be located where the fuel gas enters the building, which would serve to detect fuel gas migrating into the building from an outside source.

In the U.S., local fire departments respond to an average of 340 natural gas or LP-Gas leaks per day with no ignition (Ref 1). Although gas leaks are much more common than gas ignitions, they can be precursors to devastating fires and/or explosions. The installation of even a single fuel gas alarm would provide advanced warning to building occupants of imminent danger and would almost certainly reduce the number of annual deaths.

A **search of publicly available** information of fuel gas incidents (Ref. 3) resulting in a building explosion was undertaken to provide additional insights to Ref. 1 for the potential benefit impact of fuel gas detection devices to enhance safety for consumers utilizing a fuel gas. That review of public data from 2012 to June 2024 found 684 fuel gas incidents (130 were propane) of which 507 incidents resulted in injury and/or fatality. For those incidents, there were 312 fatalities reported averaging 24 per year. For those incidents, 1,229 injuries were reported averaging 95 per year. The data subset for the 130 propane is 77 fatalities with 155 injuries per year. This data does not represent an exhaustive review and is included to provide an indication of the profound impact on life and property that may result from utilizing fuel gas detection inside buildings.

Regarding reliability and availability of the devices, residential gas detection devices for natural gas and propane are readily available (ref 2) at Home Centers and installing and operating these life safety devices are the same as installing and operating commercially available carbon monoxide and smoke detectors.

Con Edison recognizes the life-saving benefit of fuel gas detection devices and as such is installing gas detection devices in every building the Company serves with natural gas with over 290,000 devices in service to date of a program that will eventually install about 375,000 devices. The Con Ed devices are installed where the natural gas service enters the building and report all detection alarms wirelessly to the Company. The program is the US largest case study for safety benefit of fuel gas detection devices and has demonstrated the reliability of the technology and the safety benefit. The Company devices have detected over 3,800 gas leaks of which about 80% are from piping leaks INSIDE the building. Of those gas detections, multiple leaks were of the magnitude where First Responders reported they posed an immediate risk of fire/explosion, which was avoided by an immediate action by First Responders that arrived in under 5 minutes of first detection.

New York City through Local Law 157 requires natural gas detection devices in EVERY RESIDENTIAL occupancy served with natural gas beginning in 2024. This requirement is for NEW and EXISITING buildings alike.

State of Maine on 2/8/21 through Legislative Document No. 346 requires gas detection for buildings with natural or LP gas in all group R occupancies and residential rental units.

The following States have submittals for pending regulations requiring fuel gas detection:

- CT – Residential new buildings
- IL – Group R & residential rental properties
- NC – Residential new and existing buildings
- NYS – Residential new & existing buildings up to 3 family
- TN – Residential rental properties

The lifesaving value of smoke and carbon monoxide detection devices is recognized and required by this standard. Actions taken or seeking to be taken by AHJs are now recognizing the safety value of fuel gas detection. The National Transportation Safety Board through its investigations of a multitude of natural gas incidents involving fatalities continues to seek mandate for their application. The inclusion of fuel gas detection to this standard is the next logical safety device addition to ensure the safe distribution of fuel gases to provide safety when piping systems and safety devices fail, when actions by the public/contractors precipitate a release of a fuel gas, and when the public detects an odor of a fuel gas inside a building and does not respond or take action to protect from its ignition.

Ref 1: NATURAL GAS AND PROPANE FIRES, EXPLOSIONS AND LEAKS ESTIMATES AND INCIDENT DESCRIPTIONS, NFPA Research, Aherns and Evarts, October 2018.

Ref 2: COMBUSTIBLE GAS DISPERSION IN RESIDENTIAL OCCUPANCIES AND DETECTOR LOCATION ANALYSIS, Gexcon US for NFPA Research; Davis, Engel, Pagliaro; *August 2020*

Ref 3: Public Data Summary of Gas Explosion Incidents from 2012 to June 2024.pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated installation cost per fuel gas detector should be equal to the installation cost of similar smoke and carbon monoxide detection systems in both the cost of the individual detector/alarm unit and the cost of permanent electrical wiring. In that case, the cost impact of each fuel gas detection/alarm system installed is estimated to be between $100 to $200/unit (based on manufacturer's estimate).

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal allows the building owner to install fuel gas detection systems that meet the needs of the affected building residents, the fuel gas system configuration within the building, and local regulations. In general, the need for fuel gas detection is different for nursing homes, boarding houses, apartments, and dormitories (to name a few) than for motels and lodging buildings. The number of fuel gas detectors can vary greatly depending on the location of the gas piping and type of gas appliance installed. The installation of fuel gas detection system should not be required to meet a one-size-fits-all approach. Therefore, the cost to install a fuel gas detection system can vary greatly depending on building type, how fuel gas is used, and local fire code requirements.

Attached Files

- **Public Data Summary of Gas Explosion Incidents from 2012 to June 2024.pdf**
  https://www.cdpaccess.com/comment/528/32335/files/download/7923/

Comment (CAH2)# 528

F153-24

IFC: SECTION 1032, 1032.1, 1032.2 (New), 1032.3 (New)

Proposed Change as Submitted

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Fire Code

SECTION 1032
MAINTENANCE OF THE MEANS OF EGRESS

1032.1 General. The *means of egress* for buildings or portions thereof shall be maintained in accordance with this section.

Add new text as follows:

1032.2 Maximum Occupant Load. For temporary events, where the occupant load for a building or space is greater than that specified by Section 1004, the fire code official shall be authorized to allow a higher occupant load, provided health, life, and safety requirements are maintained. The fire code official is authorized to require a public safety plan in accordance with Section 403.11.2.

1032.3 Reduced Occupant Load. For declared public emergencies, where the occupant load for a building or space is required to be less than that specified by Section 1004 the means of egress shall be maintained. Any alterations to the means of egress shall be *approved* by the *building official* or *fire code official*.

Reason: This added section would accomplish two things: under normal circumstances, the occupant load shall not be exceeded; and where circumstance dictate, an occupant loads greater than, or in some circumstances less than, would only be allowed to be modified by the fire code official.

A search for a requirement in the fire code that the occupant load cannot be exceeded did not appear readily available. Under normal operations, without any special considerations for public safety, the occupancy load should not be exceeded.

Where special considerations are provided, such as outlined in this section of the fire code, and where approved by the fire code official, occupant loads may be exceeded with provision such as a fire watch, a public safety plan for gatherings, and/or crowd managers as noted in this section. When approved by the fire code official implies other hazards or risks to both occupants and first responder not readily obvious would be addressed by the approval.

Also, as discovered during the COVID-19 pandemic, public health officials declared reduced occupancy as a function of “social distancing” or by a percentage that occupancy would need be limited to protect public health and safety. The code provides no ability to enforce a limited occupancy in such cases. Although a smaller overall occupant load represents a lower risk to egress components and other compliance issues, in some cases exits were compromised that may affect code compliance and public safety.

As examples, in certain applications doors that serve both ingress and egress were modified to ingress only without consideration of the overall egress requirements of the building. Portions of buildings were closed off, possibly altering total travel distance and/or common path of travel. Where egress travel is modified existing exit signage may cause confusion in emergency scenarios delaying egress of occupants to the public way.

In other cases, building owners created alternative arrangements to provide full services without consideration to public safety, including using sidewalks, parking lots, and other areas that may impede egress to the public way and/or the ability for first responders to provide emergency services in a manner intended by the codes.

In this scenario, the fire code official may employ one or more of the provisions of 403.11 to ensure compliance or evaluate any other hazards to improve the code compliance in circumstance where reduced occupant load may impose alternative risks to occupants, first responders, and provide overall safety in the built environment.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This new section will not impact construction and therefore will not increase the cost of construction.

F153-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: Concern about the charging language of 1032.2 where it says for temporary events. This is for any temporary event, not just one that is connected with the pandemic, and many building owners will be using this for just about anything they want to do in their building which is dangerous. Disagreement with the wording. For the reduced occupant load, there is a dependence on a declared public emergency in order to enforce that section, which might be an issue. Also, the text of provided health, life and safety requirements are maintained, is a little vague and can be interpreted in a number of different ways. There should be some language that the plan has to be approved, not just submitted. (Vote: 11-1)

F153-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 1032, 1032.1, 1032.2, 1032.3

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 1032
MAINTENANCE OF THE MEANS OF EGRESS

1032.1 General. The *means of egress* for buildings or portions thereof shall be maintained in accordance with this section.

1032.2 Maximum Occupant Load. ~~For temporary~~ When approved by the fire code official time certain events, ~~where~~ the occupant load for a building or space may be greater than that specified by Section 1004, the fire code official shall be permitted to authorize~~d to allow~~ a higher occupant load, provided a reasonable level of safety, health, property protection and general welfare is ~~health, life, and safety requirements are~~ maintained. The fire code official is authorized to require a public safety plan in accordance with Section 403.11.2.

1032.3 Reduced Occupant Load. For declared public emergencies, where the occupant load for a building or space is required to be less than that specified by Section 1004 the means of egress shall be maintained. Any non-permanent alterations associated with the public emergency to the means of egress shall be *approved* by the ~~*building official or fire*~~ *code official.*

Reason: ·

The proposed modifications are submitted based on the following requests from the committee and opponents:

Committee Question. What is in the Public Safety Plan?

The public safety plan contains 10 elements that need to be considered from 403.11.3.

Committee Question: The public safety plan should be required to be approved.

It is implied by noting the section 403.11.2, this section requires to be approved is follows:

> *…the fire code official shall have the authority to order the development of or prescribe a public safety plan* ***that provides an approved level of public safety*** *and addresses the following items:…*

Testifier comment (committee supported by motion to modify): The alterations to the means of egress should be approved by both the building and fire code official.

The commenter is correct that both the BO and FCO both interest in the means of egress. However, we didn't want to dictate both of them need to approve. The Building Code (and Building Official by proxy) generally addresses new construction and the Fire Code (and the Fire Code Official by proxy) addresses fire prevention and maintenance of the building. It is possible that some jurisdictions, the BO is involved only new construction, alternation, change of occupancy and other permanent applications; where the FCO is the primary official to deal fire prevention methods and post C of O (non-construction activities). The updated code change for CAH #2, uses the general term "code official" allowing the adopting jurisdiction to decide who approves the non-permanent changes to the MOE, either the fire code official, the building official, or both. During some emergencies the flexibility to have either official approve the temporary alternative to the original MOE may be beneficial, as opposed to two officials required to make the approval. Additional language was added to clarify that the alteration to the MOE is NOT permanent in nature and only associated with the public emergency for which the required reduced occupant load is specified.

Committee Comment: Why health, life and safety?

As noted at the hearings, the PTF was focused on the public health crisis. The comment was noted, and the language modified to reflect the same language in the purpose in the IBC (Section 101.3), as the intent of the provision.

Committee Comment: Could the reduced occupancy be used for other scenarios besides declared public emergencies?

It is possible that other events may facilitate a required reduced occupancy, however, in our evaluation the only historical event that mandated a reduced usage in the built environment was the pandemic. That was a declared public health emergency, at the federal, state, and local levels. The term "declared public emergency" was used as it would be decided by policy makers through a significant political act.

Committee Comment: Building owners may use this new provision to exceed the maximum occupant load in appropriately. Also related is the term "temporary" in the original proposal.

The "event" was first qualified to be "approved by the FCO" meaning that an application or request must be submitted in some manner to the FCO for this to be considered. In addition, the temporary was replaced by "time certain" with the implication that for these unique and/or special events that would be approved as for a specific event for a given time period. This should close the

possibility for this application not to be abused by an rogue building owner or tenant to randomly apply a greater occupancy than which would be considered safe. Consultation and approval of the AHJ is required for this application to occur.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This new section will not impact construction and therefore will not increase the cost of construction.

Comment (CAH2)# 638

F159-24

IFC: TABLE 1105.4; IBC: [F] TABLE 509.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE 1105.4 INCIDENTAL USES IN EXISTING GROUP I-2 OCCUPANCIES

Portions of table not shown remain unchanged.

ROOM OR AREA	SEPARATION AND/OR PROTECTION
~~Paint shops~~Spray rooms not classified as Group H	2 hours; or 1 hour and provide an automatic sprinkler system

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

2024 International Building Code

Revise as follows:

[F] TABLE 509.1 INCIDENTAL USES

Portions of table not shown remain unchanged.

ROOM OR AREA	SEPARATION AND/OR PROTECTION
~~Paint shops, not classified as Group H, located in occupancies other than Group F~~Spray rooms	2 hours and provide an automatic sprinkler system[a]

a. In a building equipped throughout with an automatic sprinkler system, the fire separation can be reduced to 1-hour.

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Reason: This proposal is designed to correlate requirements in the IFC Chapter 24, IBC Section 307.1.1, IBC Section 416 and IBC Table 509.1.

Table 509.1 allows an incidental use area to contain a “paint shop” provided it is separated by 2-hour construction. Table 509.1 only requires sprinklers where a 1-hour separation is provided. Other code sections read as follows:

1. IBC Section 307.1.1 Item 1 states that the application of flammable finishes is not classified as a Group H occupancy provided that the operation and use comply with the IFC and IBC.
2. IFC Section 2404.2 states that spray rooms shall be constructed under the IBC and shall have a minimum 1-hour separation.
3. IBC Section 416.2 states that spray rooms shall have a minimum 1-hour separation.
4. IFC Section 2404.4 states that spray rooms shall be protected with sprinklers or a fire-extinguishing system.
5. IBC Section 2404.4 states that spray rooms shall be protected with sprinklers or a fire-extinguishing system.

The inconsistency occurs in Table 509.1 which allows an incidental use area to have 2-hour separation without sprinklers or a fire-extinguishing system. Since the spray room is not a Group H, then it would be classified as Group F-1. The only time a 2-hour separation is required is when the spray room is located in an unsprinklered building according to IBC Table 508.4. But even when the spray room is located within an unsprinklered building, the spray room is required to be protected with sprinklers or a fire-extinguishing system.

Table 509.1 implies that an spray room is acceptable if it is separated by 2-hour construction without any type of fire-extinguishing system.

The term “paint shop” is not used anywhere else in the IBC, and only appears once in IFC Table 1105.4, and does not appear at all in NFPA 33 or NFPA 34. It is an outdated term and is not appropriate. This term will be replaced with spray room in IFC Table 1105.4 and IBC Table 509.1. IFC Table 1105.4 retains the language of “not classified as Group H” to address existing facilities that may have been

designed as a Group H occupancy.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply clarifies the text and correlates the terminology.

F159-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the change in terminology would remove correlation with NFPA. The intent is specific to "paint rooms." (Vote14-0)

F159-24

Individual Consideration Agenda

Comment 1:

IFC: TABLE 1105.4; IBC: [F] TABLE 509.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

TABLE 1105.4 INCIDENTAL USES IN EXISTING GROUP I-2 OCCUPANCIES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
~~Spray rooms~~ Paint shops not classified as Group H	2 hours; or 1 hour and provide an automatic sprinkler system

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

2024 International Building Code

[F] TABLE 509.1 INCIDENTAL USES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Spray rooms	2 hours and provide an automatic sprinkler system[a]
In Group I-2, paint shops not classified as Group H	1 hour

a. In a building equipped throughout with an automatic sprinkler system, the fire separation can be reduced to 1-hour.
For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m^3.

Reason: This proposal was disapproved at CAH 1 because the term "paint shop" is used in NFPA 101 for in Group I-2 occupancies. This comment revises the proposal to include the term paint shop for Group I-2.

Table 1105.4 is specific to existing Group I-2 occupancies. The term paint shop is reinserted in this table and spray room is deleted.

Table 509.1 applies to new so a new row is added to address paint shops in Group I-2. New Group I-2 will be provided with sprinklers, so the paint room requirement is to add 1-hour separation for the paint room. This is consistent with NFPA 101.

Spray rooms is retained in Table 509.1 as it is a defined term in the IBC/IFC and has specific requirements in IBC Section 416 and IFC Section 2404.5.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the text and correlates the terminology.

Comment (CAH2)# 520

F161-24

IFC: SECTION 1107, 1107.1, 1107.1.1, 1107.1.2

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Delete without substitution:

~~SECTION 1107~~
~~ENERGY STORAGE SYSTEMS~~

Revise as follows:

~~1107.1~~ **1207.12 Pre-existing Lithium-ion technology energy storage systems.** The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.3 and ~~installed prior to the jurisdiction's adoption of the 2018 or later edition of the *International Fire Code*~~that are not listed to UL 9540 shall provide the *fire code official* a ~~failure modes and effects analysis (FMEA) or other *approved* hazard mitigation analysis~~ technical report in accordance with Section 104.2.2 for review and approval.

~~**Exception:** Detached one- and two-family *dwellings* and *townhouses*.~~

~~1107.1.1~~ **1207.12.1 Early detection.** In addition to ~~the requirements of Sections 1207.1.8.1 and 1207.1.8.2~~ identifying potential failure events, the ~~analysis~~ report shall include an assessment of the ability of the installed protection systems to provide for early detection and notification of ~~a thermal runaway event in relation to the ability of~~ emergency responders ~~to safely mitigate the size and impact of a thermal runaway event~~.

~~1107.1.2~~ **1207.12.2 Corrective action plan.** Where hazards are identified by the analysis, a plan that includes a timetable for corrective action shall be submitted to the *fire code official* for review and approval. The plan shall include actions and system improvements necessary for eliminating or mitigating any identified hazards, including listed methods for early detection and notification of a thermal runaway event.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

The main purpose of this proposal is to move the language from Chapter 11 over to Section 1207. The issue is not a building feature retrofit topic, it is one of ongoing operation and maintenance of energy storage systems which requires an operational permit from the fire code official. As an operational issue the language belongs in Section 1207 for application to the existing systems before operational permits are issued or renewed.

If the Committee approves the proposal to have 1207 point to NFPA 855, the reference to Table 1207.1.3 would be changed to a reference to the thresholds Table in NFPA 855, Chapter 1.

The exception for one- and two-family dwelling and townhouses has been deleted. The exception conflicts with over all application of the IFC pursuant to Chapter 1, the IFC generally applies to all occupancies, any exceptions are based upon the adopting authority. The hazards presented by unlisted ESS are similar and the AHJ needs the flexibility to rely on this requirement if they have an active program for these occupancies, and more importantly, when they become aware of a potential problem with an existing installation.

In Section 1207.12 The use of the IFC edition date has been eliminated and replaced with the lack of a UL 9540 listing as the more accurate trigger relative to system safety. The language referring to an FMEA or other approved HMA has been replaced with “Technical Report, with what is to be covered by the technical report provided in the following subsections.

In Section 1207.12.1 The reference to Sections 1207.1.6.1 and 1207.1.8.2 have been deleted to eliminate a conflict, both sections are geared to assessing new installations and Section 1207.1.6.1 could lead one to believe if none of those listed items apply, they are done. Replacing the language with “identifying potential failure events” provides clearer instruction within the section itself. The language referring to the emergency responders' abilities has been removed as subjective and unpredictable in many cases. The intent of the requirements is to assess potential hazards and take action to correct the hazards preventing an event.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposed is to move an existing requirement addressing operational activities subject to an annual permit from Chapter 11 to Section 1207 for ESS. The additional changes made clarifies the language and eliminated a conflict. The end result of application has not changed.

F161-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: 1207.12.1 Early detection. In addition to identifying potential failure events, the report shall include an assessment of the ability of the installed protection systems to provide for early detection and notification to ~~of~~ emergency responders.

Committee Reason: This was approved as it is more appropriately located within Chapter 12 versus Chapter 11 which is focused on construction retrofit requirements. This is operational and maintenance in nature. The modification is simply using the correct wording to make it clear that detection and notification is "to" the emergency responders. (Vote 13-0)

F161-24

Individual Consideration Agenda

Comment 1:

IFC: 1207.12

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

1207.12 Pre-existing Lithium-ion technology energy storage systems. The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.3 and that are not listed to UL 9540 shall provide the *fire code official* a technical report in accordance with Section 104.2.2 for review and approval.

Exception: Detached one- and two-family *dwellings* and *townhouses.*

Reason: This Public Comment for CAH #2 seeks to un-strike the exception for detached one- and two-family dwellings, to maintain consistency with the intent of this section when it was created last cycle for the 2024 IFC, and consistency with other Committee action in CAH #1 for the 2027 IFC.

Section 1107 originated with Proposal F121-21, just one cycle ago. The Reason Statement for F121-21 speaks about commercial ESS only, and lists as one individual example the large-scale ESS facility incident in Surprise, Arizona. The language of the 2024 IFC states that in cases where ESS was installed prior to AHJ adoption of the 2018 or later IFC, the owner shall provide to the fire code official a failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis. Apparently recognizing that FMEA analysis, assessment of the ability for early detection and notification, and a corrective action plan were overly restrictive for residential applications, the F121-21 Reason Statement states: "An exception for one- and two-family dwellings and townhouses is included."

Proposal F161-24 changes the compliance trigger to ESS "that are not listed to UL 9540" and changes the first requirement from FMEA to "a technical report," and includes requirements that the owner shall provide analysis of the system for identifying potential failure events, for early detection and notification of first responders. While this is likely appropriate for commercial ESS, it is still overly restrictive for residential ESS. The owners of residential systems might or might not have any awareness of when their ESS was installed or under what conditions of listing, and they are highly unlikely to have the knowledge needed to hire a consultant to prepare a technical report. We should be hesitant to include in the code provisions that are very unlikely to be implemented or enforced, and would most likely surface only through expert testimony during court cases should an incident occur. In the absence of any incident for residential ESS, the fire code official might be in the unfortunate position of trying to explain the technical report requirements to a homeowner, or forcing a homeowner to remove the ESS if early detection and notification systems are not present.

It is especially noteworthy that the Reason Statement for F161-24 states: "The issue is not a building feature retrofit topic, it is one of ongoing operation and maintenance of energy storage systems which requires an operational permit from the fire code official." During CAH #1, Proposal F4-24 was Approved As Modified with a new second sentence: "Operational permits shall not be required for ESS located at detached one and two-family dwellings and townhouses, other than Group R-4."

Further, during CAH #1, Proposal F170-24 was Approved As Modified, with the following exception to Section 1207.1: "These requirements shall not apply to ESS in buildings and structures designed and constructed in accordance with the International Residential Code."

To be consistent with the original intent of F121-21; to avoid overly restrictive provisions for residential ESS; and to remain consistent with CAH #1 Committee action on F4-24 and F170-24, the exception for detached one- and two-family dwellings and townhouses should be restored in this section of the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

For residential ESS only, to un-strike and restore the exception for detached one- and two-family dwellings and townhouses will result in avoided costs up to the value of the existing energy storage system or the cost of new replacement ESS, should the fire code official require existing ESS to be removed from the residence.

Comment (CAH2)# 734

Comment 2:

IFC: 1207.12

Proponents: William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

1207.12 Pre-existing Lithium-ion technology energy storage systems. The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.3 and that are not listed to UL 9540 shall provide the *fire code official* a technical report in accordance with Section 104.2.2 for review and approval.

Exception: Detached one- and two-family dwellings and townhouses.

Reason: As Approved by the Committee, 1207.12 applies to all existing ESS, including those installed in one- and two-family dwellings. Furthermore, technically the section will require that the ESS be listed to the edition of UL 9540 referenced in the 2027 IFC. Most likely, this will be the third edition and current equipment will not be listed to that edition and may or may not comply with that edition. For the existing equipment that is not listed to the current edition of UL 9540 a technical report will be required. The impact of this is that all existing ESS installed in one- and two-family dwellings will require a technical report.

CALSSA is not aware of significant adverse fire experience that would justify the need for a technical report for all existing ESS. Furthermore, most jurisdictions are probably not set-up to process the quantity of technical reports that would be required by this section and may have no way of identifying where existing residential systems are that require a technical report.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$2500-$3500 per system

Estimated Immediate Cost Impact Justification (methodology and variables):

Each system would potential required at least a day of time for an engineer to evaluate the existing system, the differences between the system and the current edition of UL 9540, and to prepare a report acceptable to the code official.

Comment (CAH2)# 519

F162-24

IFC: SECTION 1108 (New), 1108.1 (New)

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@ltfr.org)

2024 International Fire Code

Add new text as follows:

SECTION 1108
FIRE PROTECTION FOR POST-FIRE REPAIR OR RECONSTRUCTION

1108.1 Institutional and residential occupancies. Where an unsprinklered Group I, Group R-1, Group R-2 or Group R-4 Occupancy is repaired or reconstructed following a fire incident that caused more than 25-percent of a *fire area* to remain unoccupiable for a period of 60 or more days, an automatic sprinkler system complying with Section 903.3 shall be installed throughout such *fire area* or *fire areas* as part of the repair or reconstruction.

Reason: This proposal reflects the progress of a FCAC task group on the topic of retrofitting certain occupancies that have suffered a catastrophic fire. There was insufficient time to further discussion and consideration that might have yielded a consensus proposal, so I am submitting this as a basis for continued discussion.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue. My motivation comes from many years in the fire service observing reconstruction of unsprinklered buildings without sprinklers following a catastrophic fire, which has always struck me as illogical. If a newly built occupancy requires sprinklers, repair or reconstruction of a previously existing occupancy that suffered a catastrophic fire, particularly residential and institutional uses where occupants will be sleeping, should not be permitted by code.

During task group discussions, there was broad agreement that something could be done to address this concern in the code, but reaching agreement on code text was challenging. Essentially, the questions are, 1) what should be the trigger, or level of loss, warranting the addition of fire sprinklers in repair or reconstruction, and 2) what portion of a building should be required to be sprinklered?

Discussion explored the possibility of using fire fatalities as a Step 1 trigger, but consensus on a number of fatalities could not be reached. Some believed that a single fire fatality should be enough, while others looked at two or more or didn't support the concept. Also, defining a "fire fatality" in the code is challenging as an enforcement tool because the term might refer to individuals who were deceased at the scene, or it might also include individuals who are injured and later die as a result of such injuries. And, severe injuries might be regarded by those who deal with burn injuries as an equally sufficient justification vs. a fatality. For these reasons, the life-loss and injury triggers were abandoned in this proposal, in favor of trying to define a level of property damage that could be reasonably associated with a catastrophic fire.

Another Step 1 trigger that was considered was "multiple offender" buildings, or buildings that experience repeated fire incidents. This approach was also abandoned because consensus could not be reached on the number of fires over a time period, the damage level that should be considered as a contributing fire, or how a jurisdiction would keep track of a repeating fire incident history over time.

The approach that did gain sufficient traction was looking at a "fire area" as defined in the code to require a minimum 2-hour separation from other portions of a building, and a level of damage to a fire area that should be considered as sufficient to warrant requiring sprinklers as part of repair or reconstruction. There is not a scientific basis for establishing a threshold of this nature, so the threshold must ultimately be decided by a consensus of stakeholders. The suggested 25% of a fire area being unhabitable for a period of 90 or more days seems sufficient to serve as a benchmark. It was pointed out during discussion that, due to permitting delays, 30 days could be a very short timeframe for construction to be completed. However, it's difficult to argue that a fire wasn't a major incident if 25% of a fire area remains uninhabitable for 60 days. For example, an 8-unit fire area in an apartment building would require 3 or more units to be

vacated for 60 days to trigger this section. A 40-room hotel would require 11 rooms to be vacated for more than 60 days to trigger this section. True, this might encourage a rapid pace of reconstruction by some to avoid the sprinkler requirement, but so be it. It's better to have this requirement as a starting point in the code, and if someone can beat the clock, that should not be a reason to do nothing in the code.

With regard to Step 2, the portion of a building that should be required to be sprinklered where Step 1 has been satisfied, there were two discussion paths, either the entire building or only a sufficiently damaged fire area. This proposal suggests the latter based on feedback from the task group. Considering that a fire area might be a floor or section of a large building, much of which might not have been affected by the fire incident, some would regard it as excessive to require retrofitting sprinklers in those unaffected areas since such areas would not otherwise undergo repair or reconstruction. Hence, the suggested path of only requiring sufficiently impacted fire areas to be sprinklered. Such areas would probably experience substantial removal of drywall due to smoke and water damage, allowing for sprinkler system installation when the structure is exposed.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The best estimate is approximately $2.00 to $10.00 a square foot which is the range of cost related to the installation of automatic sprinkler systems in existing buildings.

Estimated Immediate Cost Impact Justification (methodology and variables):

Please see the following websites for the basis of the square footage costs.

https://www.angi.com/articles/home-fire-sprinklers-are-affordable.htm

https://nfsa.org/wp-content/uploads/2019/08/Retrofit-Guide-July-2019-v6-COLOR.pdf

F162-24

Public Hearing Results (CAH1)

Errata: This proposal includes published errata https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as submitted as it was felt a reasonable trigger for the installation of an automatic sprinkler system after a fire based upon the type of occupancy and the extent of damage. It was noted that many jurisdictions in California already require this. There was concern that this will often trigger an entire infrastructure that did not exist previously and questions remain as to what the 60 days will include. Some also felt a better understanding how this will work with tax credits and the insurance industry is needed. (Vote 11-3)

F162-24

Individual Consideration Agenda

Comment 1:

IFC: 1108.1

Proponents: Jonathan Humble, Jonathan Humble, FAIA, LLC, National Multi-Family Housing Council (festeel@att.net) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

1108.1 Institutional and residential occupancies. Where an unsprinklered Group I, Group R-1, Group R-2 or Group R-4 Occupancy is repaired or reconstructed following a fire incident that caused more than ~~25 percent~~ 50 percent of a *fire area* to remain ~~unoccupiable~~ unsafe for occupancy for a period of ~~60~~ 180 or more days, an automatic sprinkler system complying with Section 903.3 shall be installed throughout ~~such~~ the affected *fire area* ~~or fire areas~~ as part of the repair or reconstruction.

Reason: The modifications shown attempt to further modify the proposal based on the testimony at the 2024 CAH-1 and other resources, as follows: The original 25 percent was arbitrarily chosen,. This proposal increases the value to 50 percent, a value that NMHC believes more suitable in determining the outcome of the future project that would include an automatic fire suppression systems (e.g., repair or reconstruction).

The NMHC preferred to have a scale that could better justify what constitutes the fire area not being occupiable, or habitable in the case of apartment buildings. Since the term "unoccupiable" is not defined and could mean anything to anyone at any time, the NMHC recommends the use of the phrase "unsafe for occupancy" which is defined in both the International Building and Fire Codes (Chapter One).

The change from 60 to 180 days is being proposed to reflect the current amount of time for seeking multiple approvals necessary to initiation and complete the repair or reconstruction. The additional days also provides additional time for the building owner to discuss the long term opportunities, such as seeking and acquiring approvals from other parties directly involved such as: banks and insurance companies, government subsidy programs, affordable housing, etc.

The phrase “or fire areas” was deleted to be consistent with the start of this provision which identified a single fire area. Any other fire areas, unless impacted by the same fire, are expected to received minor alterations for the water line to pass through to the affected fire area.

Further, the original cost impact statement contained construction values for one- and two-family dwellings only. For apartments the additional cost would include the installation of a new water supply line from the street, a new reduced pressure back-flow preventer, new floor drain or drains for the RPBP, and sprinkler supply lines/risers to the individual affected apartments, or, if a local municipal water supply is not available the installation of a tank, pump, and related power, alarm, and other systems necessary to make the new system work.

Bibliography: No material for the bibliogrpahy.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost impact will increase because of the caveat of requiring the installation of an automatic fire suppression system as part of a repair project, which was the intent of the original code change proposal. For apartments this will include the installation of a new water supply line from the street, a new reduced pressure back-flow preventer, new floor drain or drains for the RPBP, and sprinkler supply lines/risers to the individual affected apartments. For those apartment buildings located outside of a reliable metropolitan water service the additional costs could include the installation of a water pump and tank as the other option. Further, in areas of the US, there is the opportunity for the jurisdiction to increase the appraised value of the building because there exist jurisdictions where anything beyond a repair is considered new construction and therefore subject to an increase in appraised or taxable value.

Estimated Immediate Cost Impact Justification (methodology and variables):

Specific cost impacts will be dependent upon the amount of damage overall as a result of the fire. In regard to financial off-set programs to assist in subsidizing repair costs, that will vary depending upon availability of such programs and their limitations, if in fact they are

available for such repairs.

Comment (CAH2)# 495

F168-24 Part I

PART I - IFC: SECTION 1205.6 (NEW)

PART II - IMC: SECTION 805.9 (NEW), 806.2 (NEW)

Proposed Change as Submitted

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART II WILL BE HEARD BY THE INTERNATIONAL MECHANICAL CODE.

2024 International Fire Code

Add new text as follows:

1205.6 Pathways adjacent to chimneys. Where a solar photovoltaic (PV) system located adjacent to a chimney that is constructed to comply with Section 2113 of the *International Building Code*, or Section 805 or 806 of the *International Mechanical Code*, a 36-inch-wide (914 mm) pathway shall be provided between the chimney and a solar photovoltaic (PV) system. The pathway adjacent to a chimney shall continue and access other pathways.

Reason: The proposed code changes address a regulatory gap in the IBC, IRC and IMC where the interaction of rooftop solar PV systems with chimneys serving solid fuel-burning fireplaces and appliances is not addressed. Chimneys convey heat and products of combustion that include glowing sparks, which can land on solar PV systems and pose a fire hazard. The IBC, IRC and IMC do not require spark arrestors; however, the IBC addresses the construction of spark arrestors when added atop a chimney primarily to address possible interference with drafting a chimney.

The IBC, IRC and IMC also do not address working clearance around chimneys since it was not envisioned that structures occupying large portions of the roof area would be placed on the roof near chimneys. Solar photovoltaic systems are becoming very common, and the proposed code changes address clearances adjacent to the chimney necessary for firefighting access and for servicing a chimney.

The proposed code change will be processed in three parts since the IBC Structural Committee and the IRC Building Committee convene in the Group B cycle in 2025. The International Fire Code Committee and the International Mechanical Code Committee in Group A will consider the first two parts during 2024. In an effort to show participants in Group A the totality of the proposal, the following two bullet points show proposed Group B code changes.

- IBC Ch 21 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows.

  2113.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section 2113.9.2 of the International Building Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

  IRC Ch 10 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows. Note that prior to the submittal deadline for Group A, the 2024 IRC was not available for review through ICC's digital codes premium service, so text from the 2021 IRC is shown below.R1003.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section R1003.9.2 of the International Residential Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

Code change RB285-22 was submitted for the 2024 IRC, and the submitted public comment, similar to this proposed code change, was not considered during the PCH since insufficient votes were available to overturn the Committee. Several IRC Building Committee members were receptive to the issue, which in the initial submittal focused on treating the solar PV installation as a part of the building and, therefore, requiring the chimney to extend 2 ft higher than solar PV within 10 ft the chimney. The report of the CAH states in part, " When you add the roof-mounted photovoltaic system to a building, it becomes a portion of the building.", which styles the initial issue.

This code change addresses another problem identified during the CAH: firefighting and maintenance access to a Chimney. Plumbing vents and mechanical equipment had been the most common roof projections until the popularity of solar PV systems, with the latter occupying large areas of the roof when compared to discreet items that the plumbing code and mechanical regulates in proximity to product conveying ducts.

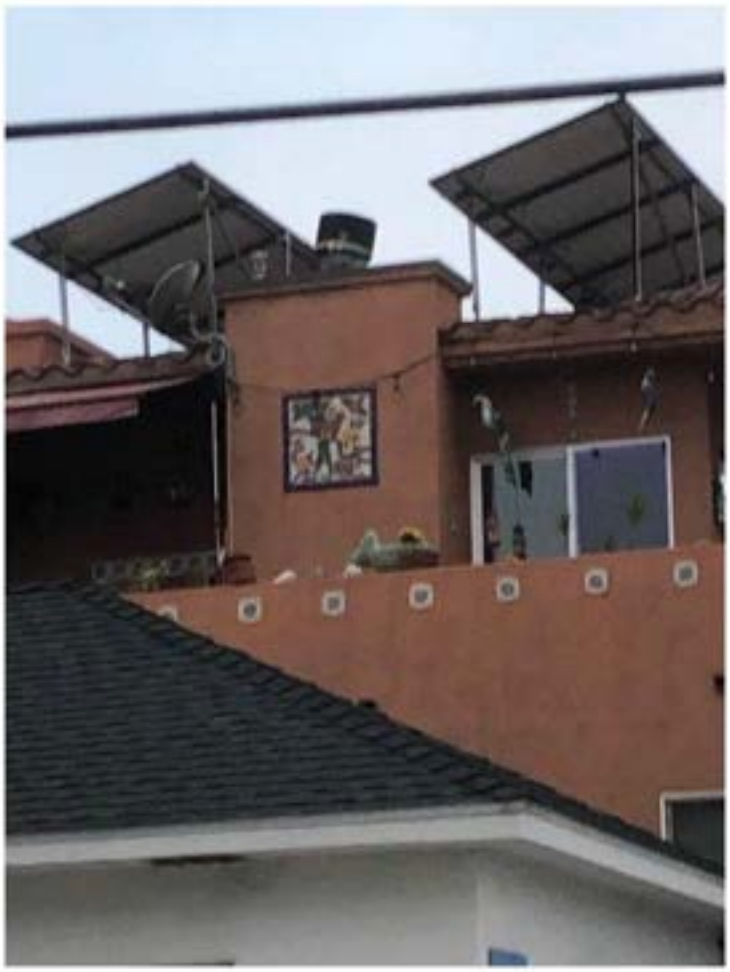
The proposed code change addresses the fire hazards and roof access issues the two independently regulated rooftop components pose. It is worth noting that the IBC, IRC, and IMC do not require spark arrestors and that the two building codes only address the construction of spark arrestors; the proposed code changes will address this regulatory gap. Additionally, chimney requirements have not changed for decades, and documentation regarding their functioning is not available or proprietary.

The proposal includes photos showing three cases (photos 3 to 5 spark arrestors would be required as well as 3 ft pathways) of what could happen when solar PV installations adjacent to the chimney are not regulated. Two photos (1 and 2) of a chimney fire to highlight why roof clearance should be required.

https://www.cdpaccess.com/proposal/9918/30619/files/download/4135/

https://www.cdpaccess.com/proposal/9918/30619/files/download/4780/

Chimney Fire



Bibliography:

- Rockfort Chimney Supply
- Forbes

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average cost of a spark arrestor is approximately $300, and it can easily be installed by a solar contractor unable to set back rooftop-mounted photovoltaic panel systems. Additionally, the average cost of a rooftop solar system is approximately $11,278 after solar tax credits.

Estimated Immediate Cost Impact Justification (methodology and variables):

I went online to search the cost of spark arrestors at Rockfort Chimney Supply and went to Forbes for the cost of solar systems in California.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This was not seen as necessary and does not align with the IRC. There is no evidence that this will assist with fire fighter safety. (Vote 14-0)

F168-24 Part I

Individual Consideration Agenda

Comment 1:

IFC: 1205.6

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

1205.6 Pathways adjacent to chimneys. ~~Where a solar photovoltaic (PV) system located adjacent to a chimney that is constructed to comply with Section 2113 of the *International Building Code*, or Section 805 or 806 of the *International Mechanical Code*, a 36-inch-wide (914 mm) pathway shall be provided between the chimney and a solar photovoltaic (PV) system. The pathway adjacent to a chimney shall continue and access other pathways.~~ A 36-inch wide (914 mm wide) pathway shall be provided between a chimney and a solar photovoltaic (PV) system where a solar photovoltaic (PV) system is located adjacent to a chimney constructed in accordance with either Section 2113 of the International Building Code or Sections 805 or 806 of the International Mechanical Code. The pathway adjacent to the chimney shall continue and provide access to other pathways.

Reason: This modification is being submitted by a proponent who could not participate in discussing the code change at CAH1. The submittal has been prepared after viewing the thoughtful comments provided by two speakers in support, one of whom submitted an editorial Floor Modification F168-24 Part I-HIRSCHLER-MP1 that was ruled out of order by the chair. Four speakers spoke in opposition, mainly to the spark arrestor issue proposed in Part II of the code change heard by the IMC Committee.

Confusion has resulted from ICC's decision, based on Committee responsibilities, to split the original code change into parts I and II, with each part being heard by a separate Committee; the reason statement for each part was not separated by the proponent. Persons who spoke about the proposal at the International Fire Code Committee hearing, mainly those in opposition, were mostly speaking regarding the Part II portion addressing spark arrestors that were to be heard later in the schedule by the International Mechanical Code Committee.

The proposal was purposefully added in a separate section since it addresses a condition different than the fire-fighting access necessary to ventilate the attic and areas below the roof addressed in Section 1205.2. The Section was added as proposed and not included in the Mechanical Code and Building Code due to stakeholder input during code development during the 2024 IRC hearing to allow the solar installers to know of the requirement's existence. A similar code change will be proposed to the IRC in Group B as the reason statement for the original code change is clarified.

The proposal purposefully addresses all chimneys correctly based on input from one of the speakers in opposition since all chimneys, especially solid fuel-burning chimneys, must be serviced at some point. Chimney sweeps need access to remove soot from solid fuel-burning chimneys. The proposal was submitted

based on discussions with stakeholders from the chimney industry. Solar arrays occupy more space than rooftop mechanical equipment required by the mechanical code to be separated from chimneys used to exhaust combustion products. It would be accurate that the proponent cannot point to a case of rooftop solar arrays that impeded access to a chimney fire, neither were the issues that led to the development of Section 1205.2. Yes, the chimney is commonly present first, and the rooftop solar arrays come later, as was pointed out, which is precisely why this code change is being proposed since chimney installers are never consulted. Ironically, more extensive pathways required in Section 1205.2 did not pose an issue, causing difficulty in providing sufficient solar energy yield.

The IBC, IRC, and IMC also do not address working clearance around chimneys since it was not envisioned that structures occupying large portions of the roof area would be placed on the roof near chimneys. The solar industry is relatively new, a speaker mentioned 10 years, and building standards have been progressively added in reaction to new solar innovations such as BIPV, etc; the proposal addresses a regulatory gap that was not addressed since the chimney industry does not participate regularly.

Solar photovoltaic systems are becoming very common, and the proposed code changes address clearances adjacent to the chimney necessary for firefighting access and servicing the chimney. However, as one of the speakers in opposition incorrectly raised, the code change proposal does not address ember escape. Spark arrestors protect against ember escape and not the proposed pathway. An attachment includes photos extracted from the web to highlight access issues necessary to maintaining chimneys that includes waterproofing and cleaning as well as repairs.

The Building Official can address conditions where an abandoned chimney occurs, presumably when the fuel burning appliance is removed. The proposed code change will be processed in three parts, the last in the IRC Building and IRC Mechanical/Plumbing Committee.

General summary of Testimony

Speaker	Organization	Support/Opposition	Issue
James Carver	So Cal FPO	Support	Spoke on behalf of proponent who was absent
Marcello Hirschler	GBH International	Floor modification	Proposed an editorial floor modification
Joe Cain	CALSEIA	Oppose	There are no widespread concerns, and the code change is a solution in search of a solution. Most of the presentation addressed the spark arrestor but failed to address the concern regarding access to the chimney for maintenance and fire-fighting access.
Paul Armstrong	CALSEIA	Oppose	Me too wave
Bill Koffel	Koffel Assoc	Oppose	The I codes do not require such access; they only address rooftop solar, and not other items.
A	TESLA	Oppose	Fire service never addressed the pathway for gas-burning appliances in the past 10 years. Access is not necessary due to ember escape and chimneys not necessary for serving gas appliances. This raised an issue with non-functional closed-off chimneys. The speaker spoke to spark arrestors getting clogged, impacting chimney drafting, and questioned the effectiveness of Section 2113.9.2 without justification.
Robert Davidson	Davidson Code Concepts	Oppose	Discussed fire classification of roof and solar panels. Difficult to get what you need to get the job done.

One comment provided by sympathetic stakeholders is that the code change is not necessary since there are no known problems. I code changes are often not reactionary and seek to address regulatory gaps before incidents occur; an example is the fire hazards due to the interaction of rooftop solar and roof coverings from the standpoint of fire classification of roof coverings; the code change was prompted due to lab testing and not real-life wildfire observation and data gathering.

Attachment 1 offers photos of local installations in San Diego within five City blocks of one another, showing that a clear space is actually being provided, most likely to facilitate the removal/replacement of panels and maintenance access for the solar arrays and chimney. Attachment 2 offers photos showing the need for access to chimney maintenance.

A minor editorial change was made in the last sentence to require that the proposed maintenance and fire fighting pathway connect with other pathways

The Committee voted 14-0 to disapprove based on testimony in opposition stating that the code change is unnecessary and would not align with the IBC or IRC. The proponent does not agree.

Cost Impact: Increase

Estimated Immediate Cost Impact:

It can be assumed that the code change will minimally increase the cost of construction due to the elimination of a limited roof area if the chimney is surrounded by roof on all sides. If the chimney is on a roof edge, the fire access pathway can be concurrent. Ridge setbacks also are concurrent with fire access pathways.

Estimated Immediate Cost Impact Justification (methodology and variables):

Quantitatiley determined.

Attached Files

- **F168-24-FATTAH-C1 Part I How to Clean Your Chimney.pdf**
  https://www.cdpaccess.com/comment/69/32384/files/download/7933/
- **F168-24-FATTAH-C1 Part I Installation photos.pdf**
  https://www.cdpaccess.com/comment/69/32384/files/download/7932/

Comment (CAH2)# 69

F168-24 Part II

PART II - IMC: SECTION 805.9 (NEW), 806.2 (NEW)

Proposed Change as Submitted

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Mechanical Code

Add new text as follows:

805.9 Spark arrestor required. Factory-built *chimneys* serving solid fuel-burning *appliances* shall be protected with a spark arrestor complying with Section 2113.9.2 of the *International Building Code* where solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

806.2 Spark arrestor required. Metal *chimneys* serving solid fuel-burning *appliances* shall be protected with a spark arrestor complying with Section 2113.9.2 of the *International Building Code* where solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

Reason: The proposed code changes address a regulatory gap in the IBC, IRC and IMC where the interaction of rooftop solar PV systems with chimneys serving solid fuel-burning fireplaces and appliances is not addressed. Chimneys convey heat and products of combustion that include glowing sparks, which can land on solar PV systems and pose a fire hazard. The IBC, IRC and IMC do not require spark arrestors; however, the IBC addresses the construction of spark arrestors when added atop a chimney primarily to address possible interference with drafting a chimney.

The IBC, IRC and IMC also do not address working clearance around chimneys since it was not envisioned that structures occupying large portions of the roof area would be placed on the roof near chimneys. Solar photovoltaic systems are becoming very common, and the proposed code changes address clearances adjacent to the chimney necessary for firefighting access and for servicing a chimney.

The proposed code change will be processed in three parts since the IBC Structural Committee and the IRC Building Committee convene in the Group B cycle in 2025. The International Fire Code Committee and the International Mechanical Code Committee in Group A will consider the first two parts during 2024. In an effort to show participants in Group A the totality of the proposal, the following two bullet points show proposed Group B code changes.

- IBC Ch 21 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows.

  2113.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section 2113.9.2 of the International Building Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

  IRC Ch 10 is proposed to be amended in Group B and considered by the IBC Structural Committee as follows. Note that prior to the submittal deadline for Group A, the 2024 IRC was not available for review through ICC's digital codes premium service, so text from the 2021 IRC is shown below.R1003.9.4 Spark Arrestor Required. Chimneys shall be protected with a spark arrestor complying with Section R1003.9.2 of the International Residential Code when solar photovoltaic (PV) systems are located within 10 feet (3048 mm) of a chimney.

Code change RB285-22 was submitted for the 2024 IRC, and the submitted public comment, similar to this proposed code change, was not considered during the PCH since insufficient votes were available to overturn the Committee. Several IRC Building Committee members were receptive to the issue, which in the initial submittal focused on treating the solar PV installation as a part of the building and, therefore, requiring the chimney to extend 2 ft higher than solar PV within 10 ft the chimney. The report of the CAH states in part, " When you add the roof-mounted photovoltaic system to a building, it becomes a portion of the building.", which styles the initial issue.

This code change addresses another problem identified during the CAH: firefighting and maintenance access to a Chimney. Plumbing

vents and mechanical equipment had been the most common roof projections until the popularity of solar PV systems, with the latter occupying large areas of the roof when compared to discreet items that the plumbing code and mechanical regulates in proximity to product conveying ducts.

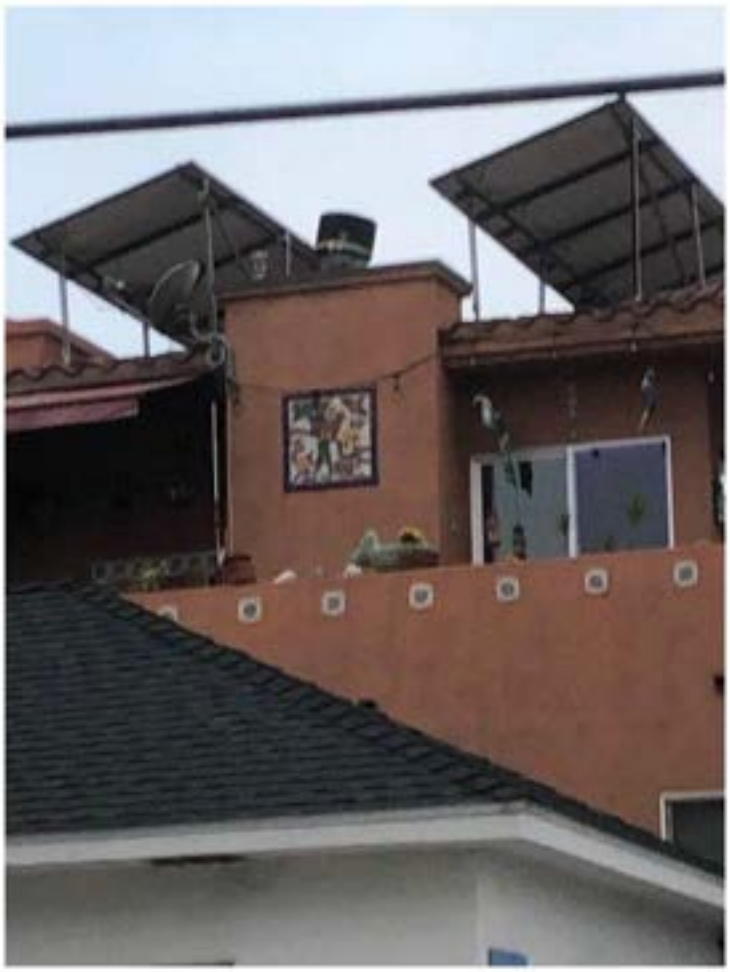
The proposed code change addresses the fire hazards and roof access issues the two independently regulated rooftop components pose. It is worth noting that the IBC, IRC, and IMC do not require spark arrestors and that the two building codes only address the construction of spark arrestors; the proposed code changes will address this regulatory gap. Additionally, chimney requirements have not changed for decades, and documentation regarding their functioning is not available or proprietary.

The proposal includes photos showing three cases (photos 3 to 5 spark arrestors would be required as well as 3 ft pathways) of what could happen when solar PV installations adjacent to the chimney are not regulated. Two photos (1 and 2) of a chimney fire to highlight why roof clearance should be required.

https://www.cdpaccess.com/proposal/9918/30619/files/download/4135/

https://www.cdpaccess.com/proposal/9918/30619/files/download/4780/

Chimney Fire



Bibliography:

- Rockfort Chimney Supply
- Forbes

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average cost of a spark arrestor is approximately $300, and it can easily be installed by a solar contractor unable to set back rooftop-mounted photovoltaic panel systems. Additionally, the average cost of a rooftop solar system is approximately $11,278 after solar tax credits.

Estimated Immediate Cost Impact Justification (methodology and variables):

I went online to search the cost of spark arrestors at Rockfort Chimney Supply and went to Forbes for the cost of solar systems in California.

Attached Files

- **Chimney 2.jpg**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4782/
- **Chimney 1.png**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4781/
- **Prefab chimney fire.pdf**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4724/
- **PV near Chimney.pdf**
  https://www.cdpaccess.com/proposal/10739/30945/files/download/4725/

F168-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of this proposal. The committee's reasoning is that this proposal would require a solar PV system, which is not necessary for buildings built to IBC and is a concern from the IRC perspective.

F168-24 Part II

Individual Consideration Agenda

Comment 1:

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov) requests As Submitted

Reason: This modification is being submitted by a proponent who could not participate in the discussion of the code change at CAH1. The submittal has been prepared after viewing the thoughtful comments provided by speakers who spoke in opposition, mainly to the spark arrestor issue proposed in Part II of the code change heard by the IMC Committee. The proponent was not able to be present at the hearing.

The spark arrestor proposed in this code change prevents the roof-top solar system from igniting, not to protect the integrity of the roof.

Fire classification of roof assemblies is meant for emergency unforeseen conditions and not the regular use of a chimney.

Spark arrestors are not a hazard, as one speaker in opposition stated they are optional, and if used, the IBC provides standards to allow them to function by reducing sparks exterior to the chimney and to allow the free venting of the products of combustion from the fire chamber below. The spark arrestor can easily be installed without tools simply by twisting a wing nut. They cost about $70 from Home Depot. These spark arrestors also offer a collateral benefit, keeping rodents and birds out of the building.

One opposing speaker stated that the code does not address the combination of solar systems adjacent to chimneys, so the proposal is submitted to close the regulatory gap. When a lack of fire history is discussed, numerous code changes of the past decades have been adopted prospectively in advance of a condition rather than being reactionary.

Collaboration in the 2022 Group B Cycle included some of the opponents in the current cycle. At the time, the focus was the extension of the chimney above the solar system, which was settled by the IRC Building committee. The original proposal was submitted without change after the proponent reviewed the video of the recorded testimony.
The proponent requests approval as submitted if constructed comments are not submitted by opponents to the code change.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 70

F175-24

IFC: SECTION 202 (New), SECTION 1208 (New), 1208.1 (New), 1208.2 (New), 1208.3 (New), 1208.4 (New), UL Chapter 80 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new definition as follows:

ELECTRIC VEHICLE POWER EXPORT EQUIPMENT (EVPE). The electrical equipment, including the outlet on the vehicle, that is used to provide electrical power at voltages equal to or greater than 30 volts AC or 60 volts DC to an external load(s) from the vehicle, where the vehicle is the source of supply.

Add new text as follows:

SECTION 1208
ELECTRIC VEHICLE POWER EXPORT EQUIPMENT

1208.1 General. The use, operation and maintenance of *electric vehicle power export equipment* shall comply with this section.

1208.2 Listing. *Electric vehicle power export equipment* shall comply with one of the following:

1. *Electric vehicle power export equipment* that performs both functions of an inverter and an electric vehicle charger shall be *listed* and *labeled* in accordance with UL 9741.
2. *Electric vehicle power export equipment*, that monitors and oversees electric vehicles with onboard AC inverter/converters, shall be *listed* and *labeled* in accordance with UL 1741.

1208.3 Installation and use. *Electric vehicle power export equipment* shall be installed and used in accordance with their listing, the manufacturer's installation instructions, and NFPA 70.

1208.4 Utility interactive. *Electric vehicle power export equipment connected* to the electric utility grid shall use inverters listed for utility interaction.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

9741-2023 Electric Vehicle Power Export Equipment (EVPE)

Reason: Electric vehicle power export equipment (EVPE) is a new trend to use an electric vehicle to provide power to the building. EVPE can be unidirectional or bidirectional. Unidirectional equipment exports power from the vehicle to an offboard load, such as a receptacle bank. Bidirectional equipment provides power to the vehicle for charging of the onboard battery, and exports power to the grid, premise or load, but export and charging do not occur at the same time. There are three manufacturers with listed equipment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed EV power export equipment may or may not represent increased product costs over obtaining non-listed equipment that have not

been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for EV power export equipment involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed equipment, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

F175-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata The standard analysis for UL 9741-2023 has been updated and can be found here. https://www.iccsafe.org/wp-content/uploads/2024-Proposed-Standards_Group-A.pdf

Committee Action: **Disapproved**

Committee Reason: This proposal would create an unsafe situation and negate the safety that is required by UL 9540. There was some concern that this needs to be acknowledged and addressed with the need for additional approval requirements. (Vote 13-0)

F175-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202, SECTION 1208, 1208.1 , 1208.2 , 1208.3, 1208.4, UL Chapter 80

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

ELECTRIC VEHICLE POWER EXPORT EQUIPMENT (EVPE). The electrical equipment~~, including the outlet on the vehicle,~~ that ~~is used to provide~~ provides ~~electrical~~ power at voltages equal to or greater than 30 volts AC or 60 volts DC to an external load(s) from the vehicle, where the vehicle is the source of supply.

SECTION 1208
ELECTRIC VEHICLE POWER EXPORT EQUIPMENT

1208.1 General. The use, operation and maintenance of *electric vehicle power export equipment* shall comply with this section.

1208.2 Listing. *Electric vehicle power export equipment* shall comply with one of the following:

1. *Electric vehicle power export equipment* that performs both functions of an inverter and an electric vehicle charger shall be *listed* and *labeled* in accordance with UL 9741.
2. *Electric vehicle power export equipment,* that monitors and oversees electric vehicles with onboard AC inverter/converters, shall be *listed* and *labeled* in accordance with UL 1741.

1208.3 Installation and use. *Electric vehicle power export equipment* shall be installed and used in accordance with their listing, the manufacturer's installation instructions, and NFPA 70.

1208.4 Utility interactive. *Electric vehicle power export equipment connected* to the electric utility grid shall use inverters listed for utility interaction.

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

9741-2023 Electric Vehicle Power Export Equipment (EVPE)

Reason: In response to comments raised at the CAH, this proposal recognizes that the fire code official cannot regulate outlets on the vehicle.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple change to the definition for Electric Vehicle Power Equipment, therefore there is no additional cost associated with this proposed change.

Comment (CAH2)# 662

Comment 2:

Proponents: Abid Anwar, Tesla (aanwar@tesla.com) requests As Submitted

Reason: F-175 should be approved as submitted. The proposed code change promotes public safety and enables Fire Officials to enforce the utilization of listed and labeled equipment for an activity already permitted by NFPA 70, NFPA 855 and the IFC. UL 9540 is not the appropriate or applicable standard to address the safety of an EV's rechargeable electrical energy storage system (REESS) used to power premises wiring. The utilization of an EV for bi-directional applications does not meet the definition of Mobile ESS in either NFPA 855, NFPA 70, IFC and UL 9540.

Electric vehicles are safe and do not constitute a previously unknown hazard. EV manufacturers are required to integrate far more robust protections in EV's than stationary energy storage given their exposure to increased shock, vibration, battery use profiles and impact forces associated with potential collisions. In fact, Tesla vehicles are less likely to experience a vehicle fire than internal combustion engine (ICE) vehicles. According to data released by NFPA and U.S. Department of Transportation, in the United States there is a vehicle fire for every 19 million miles traveled. By comparison, from 2012 – 2021, there was approximately one Tesla vehicle fire for every 210 million miles traveled, which is ten times less.[1] EVPE equipment is also extremely safe. EVPE cables are only energized when connected and locked to the electric vehicle and communication is established between the EVPE equipment and the vehicle. The bi-directional flow of electricity to the EVPE cable is automatically shut off if the connector is unlocked or communication between the vehicle and charging equipment ceases.

Safety requirements associated with the REESS are regulated by UN 38.3 and the Department of Transportation (DOT) National Highway Traffic Safety Administration (NHTSA) Federal Motor Vehicles Safety Standards (FMVSS). EV manufacturers are required to

address the hazards associated with the EV REESS and are subject to enforcement action where safety related defects are identified. Inherent to their function, EV REESS require far more robust protection systems to account for the increased mechanical, shock, absorption, vibration, crush and impact hazards associated with their non-stationary application.

Tesla is committed to helping fire departments and first responders safely handle emergency situations involving all Tesla products. We have trained thousands of first responders to appropriately handle Tesla vehicles and batteries through virtual and in-person training, through provision of decommissioned vehicles, support lines, and attendance at relevant safety and code conferences. While Tesla understands the intent of the committee in disapproval of this proposal in keeping first responders and the public safe, the belief that EV batteries are unsafe and pose a greater hazard than UL 9540 listed energy storage systems is fundamentally flawed.

Bibliography: Footnote 1: https://www.tesla.com/VehicleSafetyReport

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 536

Comment 3:

Proponents: Joseph H. Cain, P.E., Solar Energy Industries Association (SEIA), Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests As Submitted

Reason: This public comment for CAH #2 requests Approval As Submitted for F175-24. The proposal seeks to fill a gap in safety standards in the IFC. The Committee Reason states "This proposal would create an unsafe situation and negate the safety that is required by UL 9540."

Based on testimony during CAH #1, there seemed to be differences of opinion about whether Electric Vehicles (EVs) that export power to a building or a load might fit within the definition of "mobile ESS," and might therefore be subject to UL 9540 requirements. We strongly disagree with this overly broad interpretation of the definition of mobile ESS. In fact, the definition of mobile ESS found in the 2023 NFPA 855 standard seems to be problematic itself, as it is cryptic and overly broad. The definition of mobile ESS found in the 2024 IFC provides additional language that speaks to the intent of mobile ESS.

When we think of examples of mobile ESS, one common example would be ESS on a trailer that is temporarily moved to provide power to an outdoor concert. When we see an EV driving down the road or parked somewhere, we don't generally ask whether it has a power export system and then say it is unsafe if it is not listed to UL 9540, which is not an EV standard. For convenience, the two referenced definitions of mobile ESS are displayed below.

2023 NFPA 855 definition:

Mobile Energy Storage System. An energy storage system capable of being moved and utilized as a temporary source of power.

2024 IFC definition:

Energy Storage System, Mobile. An energy storage system capable of being moved and utilized for temporary energy storage applications, and not installed as fixed or stationary electrical equipment. The system can include integral wheels for transportation or be loaded on a trailer and unloaded for charging, storage and deployment.

When we look at the 2023 National Electrical Code, we find a definition specific to EV Power Export Equipment, shown below. Further, NEC Article 625 is titled Electrical Vehicle Power Transfer System.

2023 NFPA 70 (NEC) definition:

Electric Vehicle Power Export Equipment (EVPE). The equipment, including the outlet on the vehicle, that is used to provide electrical power at voltages great than or equal to 30 Vac or 60 Vdc to loads external to the vehicle, using the vehicle as the source of supply.

Proposal F175-24 seeks to provide additional safety for this specific use case, by specifically referencing UL 9741-2023, Electric Vehicle Power Export Equipment (EVPE). The Reason Statement for F175-24 states: "There are three manufacturers with listed equipment." By the time the 2027 IFC is adopted and in effect, there certainly will be many more manufacturers of EV that support this equipment. We should not wait through another three-year code cycle before they have a product safety standard for testing and listing.

This type of power export equipment is becoming commonly known as Vehicle to X (V2x), and will be much more common in the future. The Sustainable Energy Action Committee (SEAC) is very near publishing and posting a paper related to several use cases of V2x.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 784

F176-24

IFC: SECTION 202 (New), SECTION 1208 (New), 1208.1 (New), 1208.2 (New), 1208.3 (New), UL Chapter 80 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Fire Code

Add new definition as follows:

PORTABLE POWER PACK. A moveable device that contains an integral or removable battery, or batteries, that when charged are intended to provide temporary power to various outputs of the device. This includes hand portable or wheeled devices. Portable power packs are not intended to include devices regulated as mobile or portable *Energy Storage Systems (ESS).*

Add new text as follows:

SECTION 1208
SECTION PORTABLE POWER PACKS

1208.1 General. The use, operation and maintenance of *portable power packs* with an energy capacity of 1 kWh or greater shall comply with this section. **Exception:** Portable and mobile electrical energy storage systems (ESS) that are regulated by Section 1207

1208.2 Listing. *Portable power packs* shall be *listed* and *labeled* in accordance with UL 2743.

1208.3 Operation and maintenance. *Portable power packs* shall be used and maintained in accordance with the *listing* and the manufacturer's instructions. Units marked for "indoor use only" shall not be used outdoors.

Add new standard(s) as follows:

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

2743-2023 Portable Power Packs

Reason: Portable power packs that typically utilize lithium-ion batteries are used to provide temporary and portable power in applications that often previously used fuel-fired portable generators. This proposal includes safety requirements intended to address hazards associated with the use of these devices. There are currently more than eight manufacturers with listed portable power packs. The threshold of 1 kWh would not impose requirements on small battery storage devices typically used to charge personal electronic devices.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed portable power packs may or may not represent increased product costs over obtaining non-listed equipment that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for portable power packs involves both product investigation costs and costs for periodic inspection of production, as required by the definition of "listed". However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed products, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata The standard analysis for UL 2743-2023 has been updated and can be found here. https://www.iccsafe.org/wp-content/uploads/2024-Proposed-Standards_Group-A.pdf

Committee Action: **Disapproved**

Committee Reason: More information is needed as to what kind of equipment this proposal is intending to to address. (Vote 10-3)

F176-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202, 1208, 1208.1, 1208.1.1 (New), 1208.2, 1208.3, UL Chapter 80

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

PORTABLE POWER PACK. A moveable device that contains an integral or removable battery, or batteries, that when charged are intended to provide temporary power to various outputs of the device. This includes hand portable or wheeled devices. Portable power packs are not intended to include devices regulated as mobile or portable *Energy Storage Systems (ESS)*.

SECTION 1208
SECTION PORTABLE POWER PACKS

Revise as follows:

1208.1 General. The use, operation and maintenance of *portable power packs* with an energy capacity of 1 kWh or greater shall comply with this section.

~~Exception:~~ ~~Portable and mobile electrical energy storage systems (ESS) that are regulated by Section 1207~~

1208.1.1 Capacity Limit. Portable power packs with an energy capacity exceeding 20 kWh shall comply with Section 1207

1208.2 Listing. *Portable power packs* shall be *listed* and *labeled* in accordance with UL 2743.

1208.3 Operation and maintenance. *Portable power packs* shall be used and maintained in accordance with the *listing* and the manufacturer's instructions. Units marked for "indoor use only" shall not be used outdoors.

UL

Underwriters Laboratories LLC
333 Pfingsten Road
Northbrook, IL 60062

2743-2023 Portable Power Packs

Reason: This proposal sets an upper limit of 20 kWh on the size of portable power packs regulated by this section. This was a specific concern that was raised by the Committee at CAH #1. The upper limit of 20 kWh correlates with the trigger set for regulation as an ESS by Section 1207.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost for obtaining listed portable power packs may or may not represent increased product costs over obtaining non-listed equipment that have not been independently investigated to applicable standards for determining product safety and performance.

Obtaining and maintaining a listing for portable power packs involves both product investigation costs and costs for periodic inspection of production, as required by the definition of “listed”. However, the impact of any potential cost increase can be weighed by the code development committee against the user and code official safety benefits derived from requiring listed products, as well as the additional benefit of less effort needed to demonstrate or determine compliance.

Comment (CAH2)# 237

F180-24

IFC: SECTION 202 (New), 105.5.48, 1103.6.2, 2001.1, 2002.1, SECTION 2007, 2007.1, 2007.2, 2007.3, 2007.5, 2007.6, 2007.7, 2007.8, NFPA Chapter 80 (New), DOTn Chapter 80 (New), ASTM Chapter 80 (New), 905.3.5; IBC: SECTION 202 (New), [F] 905.3.5, [F] 412.7, [F] 412.7.1, [F] 412.7.2, [BE] 412.7.3, [F] 412.7.4, NFPA Chapter 35 (New), DOTn Chapter 35 (New), ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Rex Alexander, Five-Alpha LLC, Self (rex@five-alpha.com)

2024 International Fire Code

Add new definition as follows:

EMERGENCY HELICOPER LANDING AREA (EHLF). A clear area at ground level or on the roof of a building capable of accommodating helicopters engaged in fire fighting and/or emergency evacuation operations.

VERTIPORT. A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.

VERTISTOP. A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.

Revise as follows:

105.5.48 ~~Rooftop heliports~~ Heliports, helistops, EHLFs, vertiports, and vertistops. An operational permit is required for the operation of a ~~rooftop~~ heliport, helistop, EHLFs, vertiport, or vertistop.

1103.6.2 Existing ~~helistops and~~ heliports, helistops, EHLFs, vertiports, and vertistops. Existing buildings with a rooftop ~~helistop or~~ heliport, helistop, EHLFs, vertiport, or vertistop located more than 30 feet (9144 mm) above the lowest level of fire department access to the roof level on which the ~~helistop or~~ heliport, helistop, EHLFs, vertiport, or vertistop is located shall be equipped with standpipes in accordance with Section 2007.5.

2001.1 Scope. Airports, heliports, helistops,EHLFs, vertiports, vertistops, and aircraft hangars shall be in accordance with this chapter.

2002.1 Definitions. The following terms are defined in Chapter 2:
AIRCRAFT OPERATION AREA (AOA).

AIRPORT.

HELIPORT.

HELISTOP.

EMERGENCY HELICOPTER LANDING AREA (EHLF).

VERTIPORT.

VERTISTOP.

SECTION 2007
~~HELISTOPS AND~~ HELIPORTS, ~~AND~~ HELISTOPS, EHLF, VERTIPORTS, AND VERTISTOPS

2007.1 General. ~~Helistops and heliports.~~ Heliports, helistops, EHLFs, vertiports, and vertiports shall be maintained in accordance with

Sections 2007.2 through 2007.8. ~~Helistops and heliports,~~ Heliports, helistops, EHLFs, vertiports, and vertistops ~~on buildings~~ shall be constructed in accordance with the *International Building Code*~~.~~, US DOT/FAA AC 150/5390-2D, US DOT/FAA Engineering Brief No. 105, and NFPA 418, ASTM F3423, as applicable.

2007.2 Clearances. ~~The touchdown area shall be surrounded on all sides by a clear area having minimum average width at roof level of 15 feet (4572 mm) and not less than 5 feet (1524 mm) at any point. The clear area shall be maintained.~~ Heliports, helistops, EHLFs, vertiports, and vertistops shall maintain the required clearances as specified in U.S DOT/FAA AC 150/5390-2D and U.S. DOT/FAA Engineering Brief No. 105.

2007.3 Flammable and Class II combustible liquid spillage. Landing areas on structures shall be maintained so as to confine *flammable* or Class II *combustible liquid* spillage to the landing area itself, and provisions shall be made to drain such spillage away from *exits* or *stairways* serving the ~~helicopter~~ aircraft landing area or from a structure housing such *exit* or *stairway*.

2007.5 Standpipe systems. A building with a rooftop ~~helistop or~~ heliport, helistop, EHLF, vertiport, or vertistop shall be provided with a Class I or III standpipe system extended to the roof level on which the ~~helistop or~~ heliport, helistop, EHLF, vertiport or vertistop is located. All portions of the ~~helistop and~~ heliport, helistop, EHLF, vertiport, or vertistop area shall be within 150 feet (45 720 mm) of a $2\,^{1}/_{2}$-inch (63.5 mm) outlet on the standpipe system.

2007.6 Foam protection. Foam fire-protection capabilities shall be provided for rooftop ~~heliports~~ landing areas that accommodate aircraft with liquid fuel. Such systems shall be designed, installed and maintained in accordance with the applicable provisions of Sections 903, 904 and 905.

2007.7 Fire extinguishers. ~~Not less than one portable fire extinguisher having a minimum 80-B:C rating shall be provided for each permanent takeoff and landing area and for the aircraft parking areas. Installation, inspection and maintenance of these extinguishers shall be in accordance with Section 906.~~ Fire extinguishers at heliports, helistops, EHLFs, vertiports, vertistops, aircraft parking areas, refueling sites, and charging sites shall comply with NFPA 418 and NFPA 10.

2007.8 Federal approval. Before operating helicopters or VTOL aircraft from a ~~helistops and~~ heliport~~s~~, helistop, EHLFs, vertiport, or vertiport ~~approval shall be obtained~~ a favorable airspace determination shall be obtained from the Federal Aviation Administration.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

418-24	Standard for Heliports and Vertiports

DOTn

U.S. Department of Transportation
Office of Hazardous Material Safety 1200 New Jersey Avenue SE East Building 2nd Floor
Washington, DC 20590

U.S. DOT/FAA AC 150/5390-2D-2023	Heliport Design
US DOT/FAA Engineering Brief No. 105-2022	Vertiport Design

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F3423-23	Standard Specification for Vertiport Design

Revise as follows:

905.3.5 ~~Helistops, and heliports~~ Heliports, helistops, EHLF, vertiports, and vertistops. Buildings with a rooftop *~~helistop,~~ heliport, helistop,* EHLF, *vertiport, or vertistop* shall be equipped with a Class I or III standpipe system extended to the roof level on which the

~~*helistop* or~~ *heliport, helistop,* EHLF, *vertiport, or vertistop* is located in accordance with Section 2007.5.

2024 International Building Code

Add new definition as follows:

EMERGENCY HELICOPER LANDING AREA (EHLF). A clear area at ground level or on the roof of a building capable of accommodating helicopters engaged in fire fighting and/or emergency evacuation operations.

VERTIPORT. A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.

VERTISTOP. A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.

Revise as follows:

[F] 905.3.5 ~~Helistops and heliports~~ Heliports, Helistops, EHLFs, Vertiports, and Vertistops. *Buildings* with a rooftop ~~*helistop* or~~ *heliport* , *helistop,* EHLFs, *vertiport, or vertistop* shall be equipped with a Class I or III *standpipe system* extended to the roof level on which the ~~*helistop* or~~ *heliport* , *helistop,* EHLFs, *vertiport, or vertistop* is located in accordance with Section 2007.5 of the *International Fire Code.*

[F] 412.7 Heliports, ~~and~~ helistops, EHLF, vertiports, vertistops. *Heliports,* ~~and~~ *helistops,* EHLFs, vertiports *and vertistops* shall be permitted to be erected on *buildings* or other locations where they are constructed in accordance with Sections 412.7.1 through 412.7.5.

[F] 412.7.1 ~~Size~~ Design. ~~The landing area for helicopters less than 3,500 pounds (1588 kg) shall be not less than 20 feet (6096 mm) in length and width. The landing area shall be surrounded on all sides by a clear area having an average width at roof level of 15 feet (4572 mm), and all widths shall be not less than 5 feet (1524 mm).~~Heliport, helistop, EHLF, vertiport, and vertistop landing areas shall be designed in accordance with U.S. DOT/FAA Heliport Design AC 150/5390-2D. Veriports and veristops shall comply with ASTM F3423-23.

[F] 412.7.2 ~~Design~~ Rooftop landing areas. Helicopter and VTOL landing areas and the supports thereof on the roof of a *building* shall be noncombustible construction. Landing areas shall be designed to confine any *flammable liquid* spillage to the landing area itself and provisions shall be made to drain such spillage away from any *exit* or *stairway* serving the helicopter or VTOL landing area or from a *structure* housing such *exit* or *stairway*. For structural design requirements, see Section 1607.6.

[BE] 412.7.3 Means of egress. The *means of egress* from *heliports* ~~and ,~~ *helistops, EHLFs, vertiports and vertistops* shall comply with the provisions of Chapter 10. Landing areas located on *buildings* or *structures* shall have two or more *exits or access to exits*. For landing areas less than 60 feet (18 288 mm) in length or less than 2,000 square feet (186 m^2) in area, the second *means of egress* is permitted to be a fire escape, *alternating tread device* or ladder leading to the floor below.

[F] 412.7.4 ~~Rooftop heliports~~ Heliports, ~~and~~ helistops, EHLFs, vertiports and vertistops. ~~Rooftop~~ *Heliports, ~~heliports~~* and ~~*helistops,*~~ *EHLFs, vertiports and vertistops* shall comply with NFPA 418, US DOT/FAA AC 150/5390-2D and FAA Engineering Brief No. 105, ASTM F3423, as applicable.

Add new standard(s) as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

418-24 Standard for Heliports and Vertiports

DOTn

U.S. Department of Transportation
Office of Hazardous Material Safety 1200 New Jersey Avenue, SE East Building, 2nd Floor
Washington, DC 20590

U.S. DOT/FAA AC 150/5390-2D-2023 Heliport Design

US DOT/FAA Engineering Brief No. 105-2022 Vertiport Design

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3423-23 Standard Specification for Vertiport Design

Reason: These recommended changes are to better align and harmonize the IFC and IBC with recognized U.S. Department of Transportation's Federal Aviation Administration (FAA) and the National Fire Protection Association (NFPA) design standards for heliports, helistops, vertiports, and vertistops.

Bibliography:

- U.S. DOT/FAA Heliport Design Advisory Circular, AC 150/5390-2D, 2023.
- NFPA-418, Standards for Heliports and Vertiports, 2024
- Bassey, R., 2022, FAA Engineering Brief No. 105, Vertiport Design.
- **Heliport Accident Case Study NTSB No. WPR22LA018-c LLR.pdf**

  https://www.cdpaccess.com/proposal/10558/30568/files/download/4825/

- **F77 A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents Final-c.pdf**

  https://www.cdpaccess.com/proposal/10558/30568/files/download/4784

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Minimally $0.00 if currently complying. The cost impact justification provide more detail on possible costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

To calculate the potential cost impact that these recommendations may have, it is first necessary to understand how the ICC references FAA and NFPA standards, then how the NFPA references FAA standards, how FAA referenced NFPA and ICC standards, and finally how long these references have been in place.

ICC 2021 Reference to NFPA-418:

IFC 2021:

2007.1 General. Helistops and heliports shall be maintained in accordance with Sections 2007.2 through 2007.8. Helistops and heliports on buildings **shall** be constructed in accordance with the International Building Code.

IBC 2021:

[F] 412.7.4 Rooftop heliports and helistops. Rooftop heliports and helistops **shall** comply with NFPA 418.

**Based on a review of past ICC standards the above language has not changed since at least the release of the 2012 revisions.*

NFPA-418, Reference to FAA Heliport Standards: *Listed by revision year.

NFPA*418 was first published in 1967.

NFPA-418 (2011):

4.2.2 The design of the heliport, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2B, Heliport Design Advisory Circular.

NFPA-418 (2016) & (2021): **Updated to reflect FAA AC revision 2C (2021)*

4.2.2 The design of the heliport, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2C, Heliport Design Advisory Circular.

NFPA-418 (2024): **Updated to reflect FAA AC revision 2D (2024), include the term "Helistop", and add reference to FAA Engineering Brief No. 105 and include the terms "Vertiport" & "Vertistop".*

6.2.2 The design of the heliport or helistop, including all the aeronautical components, shall be in accordance with FAA AC 150/5390-2D, Heliport Design Advisory Circular, or equivalent criteria.

6.2.3 The design of the vertiport or vertistop, including all aeronautical components, shall be in accordance with FAA Engineering Brief No. 105 for Vertiports, or equivalent design criteria.

FAA AC 150/5390 Reference to NFPA and ICC:

First published in 1959 the FAA Heliport Design Advisory Circular AC 150/5390 has referenced NFPA-418 and other NFPA standards since 1977. To date the FAA Heliport Advisory Circulars has not referenced any International Code Council documents. The following statement on code is made in FAA AC 2D (2024):

Applicability

"Other federal agencies, states, or other authorities having jurisdiction over the construction of heliports not funded with AIP, CARES Act, or PFC funds have discretion in establishing the extent to which these standards apply."

1.18 Local Role and Building Code.

"Some communities have enacted zoning laws, building codes, fire regulations, etc., that can affect heliport establishment and operation. Most municipalities have a formal process such as a "Conditional Use Permit" in place for the establishment of a heliport. Check with your local Planning and Zoning Commission for details. Some have or are in the process of developing codes or ordinances regulating environmental issues such as noise and air pollution. A few localities have enacted specific rules governing the establishment of a heliport. Therefore, make early contact with officials or agencies representing the local zoning board, the fire, police, or sheriff's department, and elected personnel who represent the area where the heliport is to be located."

Cost Impact to Rooftop Heliports, Helistops, Vertiports, and Vertistops

Due to current and past referencing, those states and/or municipalities who have adopted and follow ICC Building Code and Fire Code criteria, as written, should see little to no impact in the overall cost associated with rooftop heliports or helistops. Given that the FAA is using the same physical geometry and airspace criteria for vertiports and vertistops as used by heliports and helistops in the development of those standards, it is expected that the inclusion of vertiports and vertistops into the ICC will not have an impact on overall costs associated with these rooftop use cases as well.

Cost Impact to Ground Heliports, Helistops, Vertiports, and Vertistops

Dimensional Standard

The one significant change proposed to the ICC is in deleting the word "rooftop" therefore the standard will encompass ALL heliports, helistops, vertiports, and vertiports. In so doing, the following associated costs for ground-based sites may in fact increase.

The overall size of a heliport designed to FAA standards is based on the overall length of the largest helicopter expected to operate at that site. Current FAA standards dictate that the landing area known as the Touchdown and Liftoff (TLOF), i.e., *"A load-bearing (generally*

paved) area normally centered in the FATO, on which the helicopter performs a touchdown or liftoff" should be designed to 0.83 X the overall length (OL) of the largest helicopter that will potentially land at that site. In those case where the heliport is associated with a hospital, which make up approximately 65% of all the heliports in the U.S., the minimum size for a TLOF is 40' X 40'.

Given the average size of a standard Helicopter Air Ambulance has a controlling dimensions between 39.2 feet (Bell-206B) and 45.1 feet (AS-365 Dauphin) respectively, the following cost increases would apply in those cases where the heliport would need to be increased. Provided that the current cost of poured concrete to the standard depth for a heliport range between $6.00./ sq ft to $10.00/ sq ft.

Heliport Size Increase Cost Analysis:

Bell-206B	39.2'	32.5'	1,056'	544 ft^2	$3,264	$5,440
AS-365	45.1	37.4'	1,399'	201 ft^2	$1,206	$2,010

At those location that support helicopters larger than those identified above, any cost increase would be based on how much larger the helicopter's overall length may be in comparison to the minimum 40' X 40' standard.

The largest non-military helicopter generally operated in the United States is currently the Sikorsky S-92 which has an overall length of 68.5 feet with a maximum takeoff weight of 26,500 lbs. For these larger helicopters additional consideration for weight capacity also needs to be considered, which will in turn increase cost. For this helicopter the minimum TLOF dimension would be 68.5' X 68.5' with an overall square footage of 4,692'.
Overall cost estimate at $20/$ft^2$ for the increased material would be approximately $93,840.

It should be pointed out that for both personal and public heliports may utilize a Turf surface, i.e., grass in lieu of concrete when deemed appropriate.

Potential Fire Safety Equipment Cost Increase

For ground-based heliports, NFPA-418 identifies the acceptable size and number of fire extinguishers that shall be required to meet the standard. With the deletion of the term "rooftop" all heliports, helistops, vertiports, and vertistop would be required to have a fire extinguisher of the appropriate size and category on site. The size of the fire extinguisher is dictated by the overall length of the largest helicopter, see applicable chart, that the heliport is required to accommodate. The category of fire extinguisher is dictated by NFPA-10, Standard for Portable Fire Extinguishers.

NFPA-418 Minimum Requirement. At least one portable fire extinguisher as specified in Table 11.2 shall be provided for each takeoff and landing area, parking area, and fuel storage area.

Fire Extinguisher Size Based on helicopters Overall Length

Helicopter Model	Overall Length (ft)	Overall Length (m)	Category
Brantly/Hynes B-2B	28.1	8.6	H-1
Robinson R-22 Beta	28.8	8.8	H-1
Sikorsky HU-269A/A-1/B, TH55A	29.0	8.8	H-1
Entrom F28F/ 280FX	29.3	8.9	H-1
Enstrom 480 / TH-28	30.1	9.2	H-1
MD500 E	30.8	9.4	H-1
Sikorsky 300C	30.8	9.4	H-1
Sikorsky 300CB / Cbi	30.8	9.4	H-1
Sikorsky 330 / 330SP /333	31.2	9.5	H-1
Sikorsky S-434	31.2	9.5	H-1
MD530 F	32.1	9.8	H-1
MD520 N	32.1	9.8	H-1
Brantly/Hynes 305	32.9	10.0	H-1
Eurocopter SA-316/319 Alouette	33.4	10.2	H-1
MD600 N	36.9	11.2	H-1
Eurocopter EC-120	37.8	11.5	H-1
Robinson R-44 Raven	38.3	11.7	H-1
Robinson R-66 Turbine	38.3	11.7	H-1
MDExplorer / 902	38.8	11.8	H-1
Eurocopter BO-105	38.9	11.9	H-1
Bell B206B-1,2,3	39.2	11.9	H-1
Eurocopter SA-341/342 Gazelle	39.3	12.0	H-1
EurocopterEC-135	40.0	12.2	H-1
Farchild-Hiller 360/UH-12/OH-23	40.8	12.4	H-1
Rgoerson-Hiller FH/RH-1100	41.3	12.6	H-1
Bell B407	41.4	12.6	H-1
Eurocopter EC-130	41.5	12.6	H-1
Eurocopter SA-315 Lama	42.3	12.9	H-1
Agusta Westland AW - 119 Ke	42.4	12.9	H-1
Bell B206L-1,3,4	42.4	12.9	H-1
Agusta Westland AW - 109S Grand	42.5	13.0	H-1
Eurocopter AS-350 A Star	42.5	13.0	H-1
Eurocopter AS-355 Twin Star	42.5	13.0	H-1
Bell B427VFR	42.6	13.0	H-1

Helicopter Model	Overall Length (ft)	Overall Length (m)	Category
Agusta WestlandA -119 Koala	42.7	13.0	H-1
Eurocopter BK-117	42.7	13.0	H-1
Eeurocopter C-145 / UH-72A	42.7	13.0	H-1
Agusta Westland A-109 A	42.8	13.0	H-1
Agusta Westland AW-109E Power	42.8	13.0	H-1
Bell B429	43.0	13.1	H-1
Eurocopter AS-360 Dauphin	43.3	13.2	H-1
Bell B47G	43.6	13.3	H-1
Eurocopter AS-365 DauphinH-65 Dolphin	45.1	13.7	H-1
Eurocopter EC-155	46.9	14.3	H-1
Bell B222B, UT	50.3	15.3	H-2
Bell B230	50.3	15.3	H-2
Bell B430	50.3	15.3	H-2
Kaman K-Max / K1200	52.0	15.8	H-2
Agusta Westland Westland WG30	52.2	15.9	H-2
Kaman SH-G Seasprite	52.5	16.0	H-2
Sikorsky S-76A/B/C/D	52.5	16.0	H-2
Agusta Westland AW - 139	54.7	16.7	H-2
Bell B412EP, SP, HP	56.2	17.1	H-2
Bell B212	57.3	17.5	H-2
Bell B205B, UH-1H, Huey II, 210	57.8	17.6	H-2
Eurocopter SA-330 Puma	59.6	18.2	H-2
Eurocopter SA/AS-332 Super Puma	61.3	18.7	H-2
Bell B214 ST	62.2	19.0	H-2
Sikorsky S-55 / H19	62.6	19.1	H-2
Eurocopter EC-224	64.0	19.5	H-2
Sikorsky S-70i/UH-60L Blackhawk	64.8	19.8	H-2
Sikorsky S-58 / H34	65.8	20.1	H-2
Sikorsky S-92	68.5	20.9	H-2
Sikorsky S-61 / H-3	72.8	22.2	H-2
Agusta Westland AW - 101	74.8	22.8	H-2
Boeing 107/CH-46E	84.3	25.7	H-3
Erickson S-64E Air Crane	88.5	27.0	H-3
Erickson S-64F Air Crane	88.5	27.0	H-3

Depending on the size and type of fire extinguisher required the cost can range from as little as $500.00 for a 30 lb. ABC fire extinguisher to upwards of $12,000 and above for a wheeled 250 lb. Purple K.

Cost Impact: Potential Cost Savings

INCLUSION OF EMERGENCY HELICOPTER LANDING FACILITY

By defining and including the term Emergency Helicopter Landing Facility (EHLF) it provides the Authority Having Jurisdiction the ability to apply those FAA standards in lieu of those for heliports, helistops, vertiports, and vertistops. This will in turn means that less stringent criteria can now be used and the cost associated will decrease.

ACCIDENT PREVENTION

Heliport Accident Research

In the Vertical Flight Society research paper entitled “A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents for the Purpose of Operational Risk Identification and Accident Prevention”, published May 2021, see included material, it was found that 93% of all heliport accidents occurred at heliports that did not follow FAA standards.

Price of Human Life on a Helicopter

In 2011, the FAA reported that the U.S. Government equated each human life on board a helicopter to be worth approximately $6 million.

Link to quote: https://www.aviationlawmonitor.com/2011/01/airlines/faa-human-life-worth-6-million/

Based on standard inflation, in 2024 that same amount would equate to $8.1 million.

Heliport Accident Research

2021 Grand Canyon Accident Report

In a recent out of court settlement involving a helicopter accident in Peach Springs, Arizona (NTSB Accident Number WPR18MA087)

where the heliport being utilized did not meet basic FAA standards, i.e., and approach departure path that avoids downwind operations, a jury awarded one of the familys involved $100 million dollars.

Link to review: https://aerossurance.com/safety-management/grand-canyon-air-tour-tailwind/

Link to Story: https://www.bbc.com/news/uk-england-sussex-55674015

Tucson Medical Center Heliport

Helicopter Accident at the Tucson Medical Center rooftop heliport in Tucson, Arizona, NTSB Accident Number WPR22LA018, helicopter hits incorrectly placed fire extinguisher while operating at substandard heliport. See included case study.

1. Link to Article: https://verticalmag.com/features/blind-spots-the-danger-of-inadequate-landing-infrastructure/

Attached Files

- **Heliport Accident Case Study NTSB No. WPR22LA018-c LLR.pdf**
  https://www.cdpaccess.com/proposal/10558/30568/files/download/4825/
- **F77 A Retrospective & Historical Analysis of Vertical Lift Infrastructure Accidents Final-c.pdf**
  https://www.cdpaccess.com/proposal/10558/30568/files/download/4784/

F180-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee appreciated the intent of this proposal to provide more detail on how to address these emerging technologies but felt it needed further refinement. In particular, there were concerns with how fire fighting foam should be addressed as the agents are changing. Also, as written foam systems are being applied beyond that required by NFPA 318. Associated loss history does not seem to justify. (Vote 9-5)

F180-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202; IBC: SECTION 202

Proponents: Robert Sullivan, NFPA Southwest Regional Director, National Fire Protection Association (NFPA) (bsullivan@nfpa.org)

requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

VERTIPORT. As defined in NFPA 418. ~~A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.~~

VERTISTOP. As defined in NFPA 418. ~~A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.~~

2024 International Building Code

Revise as follows:

VERTIPORT. As defined in NFPA 418. ~~A generic reference to the area of land, water, or structure used or intended to be used, for the landing and takeoff of vertical takeoff and landing (VTOL) aircraft, together with associated buildings and facilities.~~

VERTISTOP. As defined in NFPA 418. ~~A vertiport, where no refueling, recharging, maintenance, repairs, or storage of aircraft is permitted, except for unscheduled maintenance.~~

Reason: The terms and definitions "Vertiport" and "Vertistop" were first created, developed and published in the 2021 Edition of NFPA 418, Standard for Heliports and Vertiports. Those definitions were brought forward and published again, without any changes to the wording of those two definitions, in the 2024 Edition of NFPA 418. Those two definitions have now been added and included in Proposal F180-24, without any changes to the wording of either of those two definitions.

The intent of this modification to the wording of Proposal F180-24 is to add a reference to each of those definitions, in the next editions of both the International Fire Code and the International Building Code, to indicate proper credit and reference to NFPA 418, 2024 Edition, as the document from which those two definitions originated. This modification has been briefly discussed with the proponent of Proposal F180-24, and there is not expected to be any objection from him regarding this proposed modification. Additional discussions with the proponent about this modification will be held prior to CAH#2 in October, 2024.

Bibliography: NFPA 418, 2024 Edition, Sections 3.3.23 (Vertiport) and 3.3.24 (Vertistop).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a slight modification to Proposal F180-24 to add a reference to an NFPA standard. There is no cost impact as a result of this slight modification. See cost impact for the original proposal which may increase cost.

Comment (CAH2)# 790

F181-24

IFC: SECTION 202, CHAPTER 22

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

Revise as follows:

COMBUSTIBLE DUST. Finely divided solid material which ~~is 420 microns or less in diameter and which~~, when dispersed in air or oxidizing medium in the proper proportions, could be ignited by a flame, spark or other source of ignition. ~~*Combustible dust* will pass through a US No. 40 standard sieve.~~

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air or oxidizing medium, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

EXPLOSION. ~~An effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave or disruption, or both,~~ The failure of enclosing materials or structures due to an increase in internal pressure from deflagration or detonation. An explosion could result from any of the following:

1. Chemical changes such as rapid oxidation, *deflagration* or *detonation*, decomposition of molecules and runaway polymerization (usually *detonations*).

2. Physical changes such as pressure tank ruptures.

3. Atomic changes (nuclear fission or fusion).

Add new definition as follows:

FLASH FIRE. A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitible liquid, without the production of damaging pressure.

CHAPTER 22
COMBUSTIBLE DUST-PRODUCING OPERATIONS

SECTION 2201
GENERAL

Revise as follows:

2201.1 Scope. The facilities, equipment, processes and operations ~~involving~~ in which combustible dust explosion, deflagration, fire or flash fire hazards ~~and use or handling of *combustible dust*~~ exist shall comply with the provisions of this chapter.

Exceptions:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.
6. When the facility or use is outside the scope of NFPA 652.
7. Restaurants, retail bakeries, coffee shops, and similar occupancies that have limited use of flour, sugar, coffee grinds, and other finely divided combustible dust or particulate solid ingredients in preparation of foods, snacks, and similar.

2201.2 Permits. Permits shall be required for *combustible dust*-producing operations as set forth in Section 105.5.

SECTION 2202
DEFINITIONS

Revise as follows:

2202.1 Definition. The following terms are defined in Chapter 2:
COMBUSTIBLE DUST.

DUST COLLECTION SYSTEM.

FLASH FIRE.

SECTION 2203
DUST EXPLOSION ~~PREVENTION~~ CONTROL

2203.1 ~~Critical depth layer~~ Combustible Dust Hazard Identification. ~~The maximum dust layer on all surfaces, including but not limited to walls, ceilings, beams, equipment, furniture, pipes and ducts, shall not exceed the critical depth layer specified in Table 2203.1. The critical depth layer is permitted to be adjusted for explosion hazard where further evaluated in accordance with one of the following:~~

1. ~~Section 7.2.1.3 of NFPA 654.~~
2. ~~Section 4.1.3.3 of NFPA 664 for wood flour.~~

~~Accumulated *combustible dust* shall be collected by one of the methods listed in Section 2203.5.~~Where the smallest dimension of the material is less than or equal to 500 µm, the owner/operator shall be responsible for determining whether the material is combustible or explosible. Where the combustibility of a dust or particulate solid is not determined by an *approved* source, the owner/operator shall test representative samples in accordance with NFPA 652. A copy of the test results shall be provided to the *fire code official* upon request.

Delete without substitution:

~~TABLE 2203.1 CRITICAL DEPTH LAYER~~

TYPE OF DUST	CRITICAL DEPTH LAYER (INCHES)
Wood flour	1/8
All other dusts	1/32

For SI: 1 inch = 25.4 mm.

Revise as follows:

2203.2 Dust Hazard Analysis -producing and dust-handling equipment. Dust producing equipment and dust handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be *listed* and shall be maintained in accordance with the manufacturer's recommended standards. Where a dust is combustible or *explosible*, a dust hazard analysis (DHA) shall be performed and documented for new or existing facilities in accordance with NFPA 652. A copy of the DHA shall be provided to the *fire code official* upon request.

Exception: Woodworking operations that occupy areas smaller than 5000 ft (465 m2), and where dust-producing equipment requires an aggregate dust collection flow rate less than 1500 ft3/min (2549 m3/hr) and the equipment is installed in accordance with the International Mechanical Code. (NFPA 664 1.1.2)

2203.3 Dust control and management system -collection and dust-conveying systems. Dust collection and dust conveying systems shall be in accordance with Sections 2203.3.1 through 2203.3.3. Facilities where combustible dusts or powders are used, handled, generated shall have dust control, cleaning, training, operations procedures, and management procedures to prevent conditions, operations, or accumulations of combustible dusts that could pose a fire, flashfire, or explosion hazard.

2203.3.1 Housekeeping and cleaning Dust-collection systems. Dust collection systems shall be designed to collect dust emissions from dust producing equipment at the point of generation. Dust collection systems shall be in accordance with Section 510 of the *International Mechanical Code*. **Exception:** *Closed systems* using *listed* equipment and designed in accordance with manufacturer's recommendations and specifications, where cleanouts are provided in accordance with Section 2203.3.3. Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources. Facilities where combustible dusts or powders are used, handled, generated shall have regular housekeeping and cleaning procedures to prevent accumulations of combustible dusts that could pose a fire, flash fire, or explosion hazard. Dust shall be maintained at 1/8" inch or less, or as otherwise required in standards listed in Table 2205.1

Delete without substitution:

2203.3.1.1 Location. Dust collectors shall be located outside of buildings. **Exceptions:**

1. Dust collectors inside buildings complying with Section 510 of the *International Mechanical Code*.
2. Wet type dust collectors specifically *listed* for the type of dust conveyed shall be permitted inside buildings where in accordance with the manufacturer's instructions and specifications.
3. Dust collectors designed to specific NFPA standards listed in Table 2205.1 for the specific type of dust conveyed.

2203.3.1.2 Minimum conveying velocities. The minimum velocities within ducts used as part of the dust collection system shall be in accordance withTable 2203.3.1.2.

TABLE 2203.3.1.2 MINIMUM CONVEYING VELOCITIES

TYPE OF PRODUCT	FEET PER MINUTE

Fine light dust such as cotton, lint and wood flour (100 mesh and under)	2,000
Dry dust such as fine rubber molding powder	2,500
Average dust such as sawdust, grinding dust and coal dust	3,500
Heavy dust such as metal turnings, including aluminum and magnesium powder	4,000

For SI: 1 foot per minute = 0.00508 m/s.

2203.3.2 Plastic ducts and conveying systems. Plastic, fiberglass, other nonconductive ducts, duct liners or pipes shall not be used as part of ducts and conveying systems. Ductwork utilizing a combustible lining shall be permitted only in high-impact areas and where *approved*. Flexible hose shall be permitted if designed and installed in accordance with the following requirements:

1. Manufactured of static dissipative construction.
2. Used only for connections and isolation purposes.
3. Limited to 18 inches (457 mm) in length.
4. Properly grounded.

Add new text as follows:

2203.3.2 Management systems, training, and operation procedures. The owner / operator shall maintain management systems in accordance with Chapter 8 of NFPA 652 to ensure the facility and equipment is safely maintained and operated.

Delete without substitution:

2203.3.3 Cleanouts. Openings in enclosed equipment and conveyors shall be provided to allow access to all parts of the equipment and conveyors to permit inspection, cleaning, maintenance and the effective use of portable fire extinguishers or hose streams. Cleanouts for ducts used as part of the dust collection system shall be in accordance with the *International Mechanical Code*.

Add new text as follows:

2203.3.3 Documentation. A copy of the required documentation shall be maintained in accordance with NFPA 652.

Revise as follows:

2203.4 Sources of ignition. Sources of ignition shall be controlled in accordance with NFPA 652 and NFPA 70 Sections 2203.4.1 through 2203.4.9.5.

Delete without substitution:

2203.4.1 Classified electrical. Classified electrical shall be in accordance with NFPA 70. Electrical motors and electrical components of the equipment shall not be installed in the dust laden airstream unless *listed* for Class II, Division 1, locations.

2203.4.2 Static electricity. Bonding and grounding is required to minimize accumulation of static electric charge in the following locations:

1. Dust producing equipment.
2. Dust collection system.

3. Pneumatic dust conveying systems conveying *combustible dust* from one location to another, *combustible dust* conveyors, piping and conductive components. Conveying systems include transport modes such as railcars, hopper cars, boxcars, tank cars and trucks into which or from which commodities or products are pneumatically conveyed.

4. Conveying systems using metallic piping.

2203.4.3 Hot works. Hot work and similar spark-producing operations shall not be conducted in or adjacent to *combustible dust* producing areas unless precautions have been taken to provide safety. Hot work shall be permitted only in safe, designated areas in accordance with Chapter 35. Hot work is prohibited on equipment that is operating.

2203.4.3.1 Signs. Conspicuous signs with the following warning shall be posted in the vicinity of *combustible dust* producing areas or in the vicinity of *combustible dust* use: NO WELDING. THE USE OF WELDING OR CUTTING EQUIPMENT IN OR NEAR THIS AREA IS DANGEROUS BECAUSE OF FIRE AND EXPLOSION HAZARDS.
WELDING AND CUTTING SHALL BE DONE ONLY UNDER THE SUPERVISION OF THE PERSON IN CHARGE.

2203.4.4 Hot surfaces and hot equipment. In areas where a dust explosion hazard or dust flash fire hazard exists, the temperature (in degrees Celsius) of external surfaces shall be maintained below 80 percent of the lower of the dust surface ignition temperature or the dust cloud ignition temperature for worst case dusts. External surfaces shall include but are not limited to:

1. Compressors.
2. Steam, water or process piping.
3. Ducts.
4. Conveyors.
5. Process equipment.

Where steam pipes or hot surfaces occur in dust producing or dust handling areas, accumulation of dust on the surfaces shall be minimized by an *approved* method.

Exception: Drying apparatus *listed* for the intended use and installed in accordance with the manufacturer's instructions.

2203.4.5 Powered industrial trucks. Powered industrial trucks used in electrically classified areas shall be *listed* for such use.

2203.4.6 Smoking prohibited. Smoking shall be prohibited in or adjacent to dust producing or dust handling areas. "No Smoking" signs complying with Section 310 shall be conspicuously posted in such areas. Smoking shall be permitted only in designated areas.

2203.4.7 Spark-producing devices. Spark-producing devices shall not be located within 20 feet (6096 mm) of areas requiring classified electrical unless separated by a permanent partition.

2203.4.8 Self-heating materials. Materials in silos and other large storage piles of particulates prone to self-heating shall be in accordance with Section 9.4.11 of NFPA 652.

2203.4.9 Open flames and fuel-fired equipment. Open flames and fuel-fired equipment shall be in accordance with Sections 2203.4.9.1 through 2203.4.9.5.

2203.4.9.1 Release ofairborne combustible dust. Production, maintenance or repair activities that have the potential to release or force *combustible dust* to become airborne shall not be conducted within 35 feet (11 m) of an open flame or pilot flame.

2203.4.9.2 Space heaters. Fuel-fired space heaters drawing local ambient air shall not be located within electrically classified areas.

Space-heating appliances in dust-producing or dust-handling areas shall be located where not subject to the accumulation of deposits of *combustible dust.*

2203.4.9.3 Equipment listing. Fuel-fired process equipment shall be *listed* for its intended use and shall be operated and maintained in accordance with the manufacturer's instructions.

2203.4.9.4 Inspection and preventive maintenance. Inspection and maintenance of fuel-fired process equipment shall include verification that significant *combustible dust* accumulations do not exist within or around the equipment.

2203.4.9.5 Sources of combustion air. In Class II electrically classified locations, heating units shall be provided with a source of combustion air ducted directly from the building exterior or from an unclassified location.

2203.5 Housekeeping. Accumulation of *combustible dust* on surfaces inside buildings shall be maintained below the critical depth layer in Section 2203.1. Pressurized air or similar methods shall not be used to remove dust from surfaces. Accumulated *combustible dust* shall be collected by one of the following methods:

1. Portable vacuum cleaners *listed* for use in Class II, Group G, Division 1, atmospheres as defined in NFPA 70.
2. Dust collection systems.
3. Other *approved* means that will not place *combustible dust* into suspension in air.

Exception: Forced-air or similar methods shall be permitted to remove dust in accordance with NFPA 652, NFPA 654 or NFPA 664.

2203.6 Standard operational procedures. Dust-producing equipment and all associated equipment, including dust collection equipment, shall be maintained in accordance with the manufacturer's instructions and specifications and applicable codes. The inspection, testing and maintenance program shall include the following, as applicable:

1. Fire and explosion protection and prevention equipment, as applicable, in accordance with the appropriate NFPA standards.
2. Dust control equipment.
3. Control of potential ignition sources.
4. Electrical, process and mechanical equipment, including applicable process interlocks.
5. Lubrication of bearings for dust collection, dust handling and dust producing equipment.
6. Additional maintenance in accordance with the manufacturer's instructions and specifications for dust collection, dust handling and dust producing equipment.

Records shall be kept of maintenance and repairs performed. The standard operating procedures shall be submitted to the *fire code official* for review and approval. The written standard operating procedures shall be signed by the person responsible for facility operations.

2203.7 Emergency response plan. A written emergency response plan shall be developed for preventing, preparing for and responding to work-related emergencies, including but not limited to fire and explosion. The following information shall be developed into the plan:

1. Identification of dust hazards.
2. Identification and location of all utilities to affected areas.
3. Site plans or floor plans locating utility shutoff controls, including water, gas and power.
4. The potential for explosion.
5. Locations of fire-extinguishing equipment compatible with the hazards present.

6. Any additional information required by the *fire code official* .

2203.8 Training. The plans and procedures required in Sections 2203.5, 2203.6 and 2203.7 shall be *approved* by the *fire code official*. The plans and procedures shall be reviewed annually and updated as required by process changes. Initial and annual refresher training shall be provided to employees who are involved in operating, maintaining and supervising facilities that handle *combustible dust*. Initial and annual refresher training shall include:

1. Workplace hazards.
2. General orientation, plant diagrams and plant safety rules.
3. Process description or flowchart.
4. Equipment operation, safe startup and shutdown, and response to hazard conditions or an incident.
5. The location and use of all related fire and explosion protection and prevention systems.
6. Equipment maintenance requirements and practices, including visual inspections of conveyors and ducts.
7. Housekeeping requirements, including the maintenance of the critical depth layer in Section 2203.1.
8. Emergency response plans as required in Section 2203.7.

The employer shall maintain records of initial and annual training and review.

SECTION 2204
DUST EXPLOSION SCREENING TESTS

2204.1 Combustibility and explosivity tests. Where combustibility or explosivity screening tests are required to analyze the *combustible dust* as part of compliance with Section 104.9 and Section 414.1.3 of the *International Building Code*, they shall be in accordance with Section 5.4 of NFPA 652.

2204.2 Samples. Representative samples for the screening test shall be obtained in accordance with Section 5.5 of NFPA 652.

Add new text as follows:

SECTION 2204
FACILITIES, EQUIPMENT, AND OPERATIONS

2204.1 Facilities, equipment, and operations. Facilities, equipment and operations with combustible dust hazards shall be in accordance with Sections 2204.1 through 2204.4.

2204.1.1 Dust-producing and dust-handling equipment. Dust-producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be designed, installed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1

2204.1.2 Dust-collection systems. Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 511 of the *International Mechanical Code* and applicable standards listed in Table 2205.1.

2204.2 HVAC systems. Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.

Revise as follows:

~~2203.2.1~~ **2204.3 Signages and markings.** Signages and markings shall be provided in accordance with Sections 2204.3 and applicable standards listed in Table 2205.1 ~~2203.2.1.1 through 2203.2.1.3~~.

~~2203.2.1.1~~ **2204.3.1 Deflagration vent discharge area markings.** Where dust collection systems and other equipment, systems or system components are provided with *deflagration* vents , the area within the *deflagration* vent's discharge area shall be marked in an *approved*manner.

~~2203.2.1.2~~ **2204.3.2 Caution signs.** Signs that read as follows shall be posted near the dust-containing equipment with deflagration vents:CAUTION: THIS EQUIPMENT CAN CONTAIN EXPLOSIVE DUST.
KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.

~~2203.2.1.3~~ **2204.3.3 Warning signs.** Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, vent closures shall be clearly marked as follows:WARNING: EXPLOSION RELIEF DEVICE. STAY CLEAR.

Add new text as follows:

2204.4 Exhaust system and ducts. Exhaust systems and ducts shall be designed, constructed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1.

SECTION 2205
STANDARDS

Revise as follows:

2205.1 Specific hazards standards. The owner/operator of a facility with a combustible dust hazard shall be responsible for following the ~~*fire code official* is authorized to enforce~~ additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable. Mission continuity requirements found in NFPA standards are not required by this code.

TABLE 2205.1 EXPLOSION PROTECTION STANDARDS

STANDARD	SUBJECT
NFPA 61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code
NFPA 77	Recommended Practice on Static Electricity
NFPA 85	Boiler and Combustion System Hazards Code
NFPA 120	Standard for Fire Prevention and Control in Coal Mines
NFPA 484	Standard for Combustible Metals
NFPA 652	The Fundamentals of Combustible Dust
NFPA 654	Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids
NFPA 655	Standard for the Prevention of Sulfur Fires and Explosions
NFPA 664	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

2205.1.1 Dust hazard analysis. If a dust hazard analysis (DHA) is required by the *fire code official* for new or existing facilities and operations, it shall be in accordance with NFPA 652. The DHA for existing facilities shall be in accordance with Section 7.1.1 of NFPA 652.

Reason: The chapter has been completely rewritten for consistency with updated NFPA standards, to ensure that correct standards are

requirements are followed (as recommended by Chemical Safety Board and OSHA), and to provide users with an simple, organized approach for applying the correct provisions and standards. The proposed chapter is simpler and easier for users to follow and apply. The new chapter follows the same basic recognized and methodical approach found in NFPA standards:

1) Identify whether dusts or particulates are combustible or explosible, including testing where necessary.

2) Perform a DHA if combustible or explosible dusts are present. The DHA identifies where dust hazards exist and how to safely prevent and mitigate incidents.

3) Ensure that dust control and management (housekeeping, training, management-of-change, etc.) systems are in place.

4) Ensure that facilities, equipment, and operations are designed in accordance with IMC, NFPA, and related reference standards.

Importantly, this proposal also includes the reference to NFPA 652 which was missing in the prior language.

The existing Chapter 22 language included a large number of isolated details specific applications, which was misleading for users, potentially resulting in dangerous conditions and lack of compliance with referenced standards. The safe use and handling of combustible dusts is extremely complicated, with hundreds of pages of material specific standards. It does not make sense to recreate hundreds or thousands of code sections in IFC that already exist in recognized standards. However, it was also not appropriate to only list some, while ignoring many more. Therefore, most detailed items were deleted – instead requiring a DHA to determine the specific requirements, which is how the NFPA and other related standards are intended to work.

Notes on specific sections:

Explosion definition: Revised for consistency with NFPA and to reflect the context of how it is used in this chapter and elsewhere in the code.

2203.2 Woodworking Exception: For the convenience of the user, and consistency with NFPA standards, the long standing NFPA 664 exception is specifically included. This is likely the most common application that AHJs and code users will encounter. It will save users time by highlighting this common exception.

2204.1.2 The exception did not make sense.

As some text was moved between sections, in CDPACCES it appears deleted in the original location and as new language in the new location. In truth it is often existing text moved. Below shows how the chapter will appear in approved.

SECTION 2201 GENERAL

2201.1 Scope. The facilities, equipment, processes and operations involving in which combustible dust explosion, deflagration, fire or flash fire hazards and use or handling of *combustible dust* may exist shall comply with the provisions of this chapter.

Exceptions:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of combustible dust at facilities not associated with an operation that uses, handles or generates combustible dust.

5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.
6. When the facility or use is outside the scope of NFPA 652.
7. Restaurants, retail bakeries, coffee shops, and similar occupancies that have limited use of flour, sugar, coffee grinds, and other finely divided combustible dust or particulate solid ingredients in preparation of foods, snacks, and similar.

2201.2 Permits.

Permits shall be required for combustible dust-producing operations as set forth in Section 105.5.

SECTION 2202 DEFINITIONS

2202.1 Definition. The following terms are defined in Chapter 2:

COMBUSTIBLE DUST.

DUST COLLECTION SYSTEM.

FLASH FIRE

SECTION 2203 DUST EXPLOSION

PREVENTION CONTROL

2203.1. Combustible Dust Hazard Identification. Where the smallest dimension of the material is less than or equal to 500 µm, the owner/operator shall be responsible for determining whether the material is combustible or explosible. Where the combustibility of a dust or particulate solid is not determined by an *approved* source, the owner/operator shall test representative samples in accordance with NFPA 652. A copy of the test results shall be provided to the *fire code official* upon request.

2203.2 Dust hazard analysis. Where a dust is combustible or *explosible*, a dust hazard analysis (DHA) shall be performed and documented for new or existing facilities in accordance with NFPA 652. A copy of the DHA shall be provided to the fire code official upon request.

Exception: Woodworking operations that occupy areas smaller than 5000 ft (465 m2), and where dust-producing equipment requires an aggregate dust collection flow rate less than 1500 ft3/min (2549 m3/hr) and the equipment is installed in accordance with the International Mechanical Code. (NFPA 664 1.1.2)

2203.3 Dust Control and management Systems. Facilities where combustible dusts or powders are used, handled, generated shall have dust control, cleaning, training, operations procedures, and management procedures to prevent conditions, operations, or accumulations of combustible dusts that could pose a fire, flashfire, or explosion hazard.

2203.3.1. Housekeeping and cleaning. Facilities where combustible dusts or powders are used, handled, generated shall have regular housekeeping and cleaning procedures to prevent accumulations of combustible dusts that could pose a fire, flash fire, or explosion hazard. Dust shall be maintained at 1/8” inch or less, or as otherwise required in standards listed in Table 2205.1

2203.3..2 Management systems, training, and operating procedures. The owner / operator shall maintain management systems in accordance with Chapter 8 of NFPA 652 to ensure the facility and equipment is safely maintained and operated.

2203.3.3 Documentation. A copy of the required documentation shall be maintained in accordance with NFPA 652**.**

2203.4 Sources of ignition. Sources of ignition shall be controlled in accordance with NFPA 652 and NFPA 70.

SECTION 2204

DUST EXPLOSION SCREENING TESTS FACILITIES, EQUIPMENT AND OPERATIONS

2204.1 Facilities, equipment, and operations. Facilities, equipment and operations with combustible dust hazards shall be in accordance with Sections 2204.1 through 2204.4.

2204.1.1 Dust-producing and dust-handling equipment. Dust-producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be *listed* and shall be maintained in accordance with the manufacturer's recommended standards. designed, installed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1

2204.1.2 Dust-collection systems. Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 511 of the *International Mechanical Code* and applicable standards listed in Table 2205.1.

Exception: Closed systems using listed equipment and designed in accordance with manufacturer's recommendations and specifications, where cleanouts are provided in accordance with Section 2203.3.3.

2204.2 HVAC Systems. Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.

2204.3 Signages and markings. Signages and markings shall be provided in accordance with Sections 2203.2.1.1 through 2203.2.1.32204.3 and applicable standards listed in Table 2205.1.

2204.3.1 Deflagration vent discharge area markings. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, the area within the deflagration vent's discharge area shall be marked in an *approved* manner.

2204.3.2 Caution signs. Signs that read as follows shall be posted near the dust-containing equipment with deflagration vents:

CAUTION: THIS EQUIPMENT CAN CONTAIN EXPLOSIVE DUST.

KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.

2204.3.3 Warning signs. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, vent closures shall be clearly marked as follows:

WARNING: EXPLOSION RELIEF DEVICE. STAY CLEAR.

2204.4 Exhaust Systems and ducts. Exhaust systems and ducts shall be designed, constructed and maintained in accordance with the International Mechanical Code and applicable standards listed in Table 2205.1.

Section 2205 Standards2205.1 Specific hazards standards.

The owner/operator of a facility with combustible dust hazards shall be responsible for following the *fire code official* is authorized to enforce additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable. Mission continuity requirements found in NFPA standards are not required by this code.

TABLE 2205.1 EXPLOSION PROTECTION STANDARDSSTANDARD SUBJECT

NFPA 61 Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

NFPA 68 Standard on Explosion Protection by Deflagration Venting

NFPA 69 Standard on Explosion Prevention Systems

NFPA 70 National Electrical Code

NFPA 77 Recommended Practice on Static Electricity

NFPA 85 Boiler and Combustion System Hazards Code

NFPA 120 Standard for Fire Prevention and Control in Coal Mines

NFPA 484 Standard for Combustible Metals

NFPA 652 The Fundamentals of Combustible Dust

NFPA 654 Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids

NFPA 655 Standard for the Prevention of Sulfur Fires and Explosions

NFPA 664 Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The chapter has been completely rewritten for consistency with updated NFPA standards, to ensure that correct standards are requirements are followed as recommended by the Chemical Safety Board, and to provide users with an organized approach for applying the correct provisions.

F181-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: 2203.1 Combustible dust hazard identification. Where the smallest dimension of the material is less than or equal to 500 µm, the owner/operator shall be responsible for determining whether the material is combustible or explosible. Where the combustibility of a dust or particulate solid is not determined by an approved source, the owner ~~owner/operator~~ shall test representative samples in accordance with NFPA 652. A copy of the test results shall be provided to the *fire code official* upon request.
2203.3.2 Management systems, training, and operation procedures. The owner ~~owner/operator~~ shall maintain management systems in accordance with Chapter 8 of NFPA 652 to ensure the facility and equipment is safely maintained and operated.

2205.1 Specific hazards standards. The owner ~~owner/operator~~ of a facility with a combustible dust hazard shall be responsible for following the additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable. Mission continuity requirements found in NFPA standards are not required by this code.

Committee Reason: This proposal was approved as this rewrite was seen as essential due to the complexity and hazards associated with combustible dusts. There was some concern with the expansion of the requirements with the reference more broadly to NFPA standards. The modification was simply to remove the term owner/operator and replace with simply owner. The term "operator" is found in the definition for "owner." (Vote 14-0)

F181-24

Individual Consideration Agenda

Comment 1:

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC1)

Reason: This is a good code change. It sets up the chapter for alignment with the new NFPA consolidated standard on combustible dusts (NFPA 660) when it becomes available.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 702

Comment 2:

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Self (jm@klausbruckner.com) requests Disapproved

Reason: We urge the committee to disapprove this code change. While our objection is not with referencing NFPA standards in general, it is how NFPA 652 is referenced in this particular code change that is concerning. This code change is effectively removing the regulations for classified electrical, dust collection, etc. and all the details a fire inspector should have access to in the field. When referencing (as an example) NFPA 30 in Chapter 57, we do not send the users to NFPA 30 for all code regulations, but surgically send the user to specific sections of NFPA 30. An example of the language used in Chapter 57 is "*In all cases, nonmetallic piping shall be used in accordance with Section 27.4.6 of NFPA 30*." This allows fire inspectors easy access to the regulations they need to apply in the field and leaves the design details to plan checkers where access to NFPA Standards is easier.

While the reason provided in the reason statement by the code change proponent states "due to the complexity and hazard of combustible dust," combustible dust is no more complex or hazardous than flammable finish applications, as an example. General (not specific to a single material), but clear and robust regulations have been working as part of the flammable finish Chapter 22. As an example, when applying ethanol spray versus isopropanol spray, the regulations are the same regardless of flash point, flammability etc. The regulations also remain the same regardless of droplet size. The current combustible dust chapter applies the same format and general (not specific to a single material) but clear and robust regulations to protection of combustible dust. The only exception is that the combustible dust chapter has some additional regulations addressing housekeeping to prevent secondary ignitions/explosions/deflagration. The difference between this approach and sending users to NFPA 652 is that a fire inspector walking into a facility can see and understand the current regulations versus sending the fire inspector (for the most part) blanketly to a NFPA Standard. See below for objections to NFPA 652 language.

Please also note that the Combustible Dust definition in the proposed code change states "*Finely divided solid material which when dispersed in air or oxidizing medium in the proper proportions, could be ignited by a flame, spark or other source of ignition*." The current definition states "*Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a US No. 40 standard sieve*." The current definition better defines combustible dust. Additionally, there is no fire history provided that merits this change or expansion of the definition.

Please also note that the justification of cost impact is erroneous and misleading. This is NOT editorial AT ALL. All the chapters in NFPA 652 and the additional referenced standards contain a plethora of regulations that will increase the cost of construction. The expansion of the definition of combustible dust also is not considered in the cost impact. The single change of the definition will add numerous materials and operations which previously did not fall under the combustible dust definition because of particle size. The retroactivity Sections in NFPA 652 (see below) alone will severely cause an increased cost to construction for existing businesses. If the proponents chose to bring this code change, they should provide an appropriate cost impact or at least admit to the increase in cost impact to all business with the exception of some smaller woodworking shops. This is extremely unfair and does not meet ICC's Cost Impact Guide.

Additional Objections to NFPA 652 Standard being referenced blanketly:

1. Retroactivity: NFPA 652 (Section 7.1.12) requires that "Dust hazard analysis for ALL EXISTING facilities SHALL be performed retroactively prior to September 7, 2020." As soon as this code is adopted all existing facilities are rendered illegal and non-compliant creating a major liability issue for both business owners and enforcing agencies. The current language (IFC Section

2205.1.1) states “If a dust hazard analysis (DHA) is required by the *fire code official* for new or existing facilities and operations, it shall be in accordance with NFPA 652. The DHA for existing facilities shall be in accordance with Section 7.1.1 of NFPA 652.”, thereby leaving it up to the AHJ if they see any serious concern that merits retroactive application for a specific business.

2. Combustible Fibers: Inclusion of combustible fibers in NFPA 652 will create a lot of confusion since combustible fibers are addressed under a completely separate chapter and separate regulations in the fire code.

3. Standards Adopted by Reference: Proposed IFC Section 2203.2 requires a Dust Hazard Analysis (DHA) in accordance with NFPA 652. DHA is addressed in Chapter 7 of NFPA 652. Chapter 7 is simply a pointer to Section 4.2. Section 4.2 sends users to Chapters 4, 5, 6, 7, 8, 9. Effectively we have adopted the entire standard. These chapters send users to 34 other standards (including 10 new ones that haven’t been adopted before). Based on a recent interpretation by ICC Staff, if the codes send users to a standard, and those standards send the users to other standards, the users have to carry through all the criteria in the different standards all the way down that chain, thereby adopting a plethora of standards. By adopting NFPA 652, we are effectively adopting a large number of standards that THIS user cannot count.

4. Inappropriate Code Language: The following are a few examples of inappropriate language:

   - “reasonably protect occupants not in immediate proximity,”
   - “reasonably prevent serious injury from flash fires,”
   - “reasonably prevent injury from explosions,”
   - “reasonably protect adjacent properties and the public”
   - “The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that the modification does not result in an unacceptable degree of risk.”
   - "In those cases where the authority having jurisdiction (AHJ) determines that the existing situation presents an unacceptable degree of risk, the AHJ shall be permitted to apply retroactively any portions of this standard that, based on the application of clear criteria derived from the objectives in this standard, the AHJ determines to be necessary to achieve an acceptable degree of risk."

The above language used (only a few examples) is highly inappropriate, yet we are choosing to adopt this standard subjecting AHJs, consultants, and business owners to high degree of liability.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 741

F184-24

Chapter 24

Proposed Change as Submitted

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com)

2024 International Fire Code

CHAPTER 24
FLAMMABLE FINISHES

SECTION 2401
GENERAL

Revise as follows:

2401.1 Scope. This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of *flammable* or *combustible liquids* for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).
6. The application of waterborne finishes that contain ignitable liquids or that produce combustible deposits.

2401.2 Nonapplicability. This chapter shall not apply to spray finishing utilizing *flammable* or *combustible liquids* that do not sustain combustion, including:

1. Liquids that do not have a fire point when tested in accordance with ASTM D92.
2. Liquids with a flashpoint greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight.

2401.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

SECTION 2402
DEFINITIONS

2402.1 Definitions. The following terms are defined in Chapter 2:
DETEARING.

DIP TANK.

ELECTROSTATIC FLUIDIZED BED.

FLAMMABLE FINISHES.

FLAMMABLE VAPOR AREA.

FLUIDIZED BED.

LIMITED SPRAYING SPACE.

RESIN APPLICATION AREA.

ROLL COATING.

SPRAY BOOTH.

SPRAY ROOM.

SPRAYING SPACE.

Revise as follows:

SECTION ~~2404~~ 2403
SPRAY FINISHING

~~**2404.1**~~ **2403.1 General.** The application of *flammable* or *combustible liquids* by means of spray apparatus in continuous or intermittent processes shall be in accordance with the requirements of Sections 2403.2 through 2403.9.4, 2409, 2410 and NFPA 33. ~~2403 and 2404.4 through 2404.11.4~~.

~~**2404.2 Prohibited enclosures for spray application operations.** Inflatable or portable enclosures shall not be used for spray application of flammable finishes. **Exception:** Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with Section 2404.3.~~

~~**2404.4**~~ **2403.2 Location of spray-finishing operations.** Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by *fire barrier* walls and *horizontal assemblies* with not less than a 1-hour *fire-resistance rating* in accordance with the *International Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space *approved* for such use. **Exceptions:**

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with *approved* natural or mechanical ventilation shall be exempt from the provisions of Section ~~2404~~ 2403 when *approved* and where utilizing Class IIIA or IIIB *combustible liquids*.
2. In buildings other than Group A, E, I or R occupancies, *approved* limited spraying space in accordance with Section ~~2404.11~~ 2403.4.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section ~~2409~~ 2408 shall not be required to be located in a spray room, spray booth or spraying space.

~~**2404.5**~~ **2403.3 Design and construction.** Design and construction of spray rooms, spray booths, limited finishing workstations, inflatable finishing workstations, membrane enclosures and spray spaces shall be in accordance with Sections ~~2404.5.1~~ 2403.3.1through ~~2494.5.5.1~~ 2403.3.6.1.

~~**2404.5.1**~~ **2403.3.1 Spray rooms.** The design, construction, protection, operation and maintenance of spray rooms shall be in accordance with NFPA 33. ~~Spray rooms shall be constructed and designed in accordance with~~ Section 416 of the International Building Code and Sections 2403.3.1.1 and 2403.3.1.2 of this code. ~~2404.5.2 of this code, and shall comply with Sections 2404.6 through 2404.10 of this~~

~~code~~.

Add new text as follows:

2403.3.1.1 Ventilation. The ventilation system shall be designed, installed and maintained so that the flammable contaminates are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant's lower flammable limit (LFL).

Revise as follows:

~~**2404.5.2**~~ **2403.3.1.2 Floor.** Combustible floor construction in spray rooms shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

~~**2404.5.3**~~ **2403.3.2 Spray booths.** ~~The design and construction of spray booths~~The design, construction, protection, operation and maintenance of spray booths shall be in accordance with NFPA 33, and ~~shall be in accordance with~~ Sections 2403.3.1 through 2403.3.3 ~~2404.5.3.1 through 2404.5.3.6, Sections 2404.6 through 2404.10 and NFPA 33~~.

~~**2404.5.3.1 Construction.** Spray booths shall be constructed of *approved* noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.~~

~~**2404.5.3.2 Surfaces.** The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.~~

~~**2404.5.3.3 Floor.** Combustible floor construction in spray booths shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.~~

~~**2404.9**~~ **2403.3.2.1 Ventilation.** Mechanical ventilation of flammable vapor areas shall be provided in accordance with NFPA 33, Section 2403.3.2.1.1 and Section 502.7 of the *International Mechanical Code*.

~~**2404.9.3**~~ **2403.3.2.1.1 Air velocity.** The ventilation system shall be designed, installed and maintained so that the flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant's lower flammable limit (LFL). In addition, the spray booth shall be provided with mechanical ventilation so that the average air velocity through openings is in accordance with Sections ~~2404.9.1 and 2404.9.3.2~~ 2403.3.2.1.1.1 and 2403.3.2.1.1.2.

~~**2404.9.3.1**~~ **2403.3.2.1.1.1 Open-face or open-front spray booth.** For spray application operations conducted in an open-face or open-front spray booth, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through all openings is not less than 100 feet per minute (0.51 m/s).

Exception: For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).

~~**2404.9.3.2**~~ **2403.3.2.1.1.2 Enclosed spray booth or spray room with openings for product conveyance.** For spray application operations conducted in an enclosed spray booth or spray room with openings for product conveyance, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through openings is not less than 100 feet per minute (0.51 m/s).

Exceptions:

1. For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).

2. Where methods are used to reduce cross drafts that can draw vapors and overspray through openings from the spray booth or spray room, the average air velocity into the spray booth or spray room shall be that necessary to capture and confine vapors and overspray to the spray booth or spray room.

~~2404.9.4~~ 2403.3.2.1.2 **Ventilation obstruction.** Articles being sprayed shall be positioned in a manner that does not obstruct collection of overspray.

~~2404.9.8.4~~ 2403.3.2.1.3 **Filter rolls.** Spray booths equipped with a filter roll that is automatically advanced when the air velocity is reduced to less than 100 feet per minute (0.51 m/s) shall be arranged to shut down the spraying operation if the filter roll fails to advance automatically.

~~2404.5.3.4~~ 2403.3.2.2 **Means of egress.** *Means of egress* shall be provided in accordance with Chapter 10.

Exception: *Means of egress* doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

~~2404.5.3.5~~ 2403.3.2.3 **Clear space.** Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an *exterior wall* or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

~~2404.5.3.6 Size. The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *International Building Code*.~~
~~**Exception:** One individual booth not exceeding 500 square feet (46 m^2).~~

~~2404.5.4~~ 2403.3.3 **Limited finishing workstation.** The design, construction, protection, operation and maintenance of a~~A~~ limited finishing workstation shall be in accordance with ~~comply with the applicable provisions of~~ NFPA 33 ~~and Sections 2404.6 through 2404.10~~.

Add new text as follows:

2403.3.4 **Inflatable Finishing Workstation.** The design, construction, protection, operation and maintenance of an inflatable finishing workstation shall be in accordance with NFPA 33.

Revise as follows:

~~2404.3~~ 2403.3.5 **Membrane enclosures.** The design, construction, protection, operation and maintenance of membrane enclosures shall be in accordance with NFPA 33.

~~2404.5.5~~ 2403.3.6 **Spraying spaces.** Spraying spaces shall be designed and constructed in accordance with the *International Building Code*, and Section ~~2404.5.5.1 and Sections 2404.6 through 2404.10~~ 2403.3.6.1 of this code.

~~2404.5.5.1~~ 2403.3.6.1 **Floor.** Combustible floor construction in spraying spaces shall be covered by *approved*, noncombustible,

nonsparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spraying spaces.

Delete without substitution:

~~**2404.6 Fire protection.** Spray booths and spray rooms shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9. Protection shall extend to exhaust plenums, exhaust ducts and both sides of dry filters where such filters are used.~~

~~**2404.6.1 Fire extinguishers.** Portable fire extinguishers complying with Section 906 shall be provided for spraying areas in accordance with the requirements for an extra (high) hazard occupancy.~~

~~**2404.7 Housekeeping, maintenance and storage of hazardous materials.** Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4, 2404.7.1 and 2404.7.2.~~

~~**2404.7.1 Different coatings.** Spray booths, spray rooms and spraying spaces shall not be alternately utilized for different types of coating materials where the combination of materials is conducive to spontaneous ignition, unless all deposits of one material are removed from the booth, room or space and exhaust ducts prior to spraying with a different material.~~

~~**2404.7.2 Protection of sprinklers.** Automatic sprinklers installed in flammable vapor areas shall be protected from the accumulation of residue from spraying operations in an *approved* manner. Bags used as a protective covering shall be 0.003-inch-thick (0.076-mm) polyethylene or cellophane or shall be thin paper. Automatic sprinklers contaminated by overspray particles shall be replaced with new automatic sprinklers.~~

~~**2404.8 Sources of ignition.** Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2404.8.1 through 2404.8.2.4.~~

~~**2404.8.1 Drying operations.** Spray booths and spray rooms shall not be alternately used for the purpose of drying by arrangements or methods that could cause an increase in the surface temperature of the spray booth or spray room except in accordance with Sections 2404.8.1.1 and 2404.8.1.2. Except as specifically provided in this section, drying or baking units utilizing a heating system having open flames or that are capable of producing sparks shall not be installed in a flammable vapor areas.~~

~~**2404.8.1.1 Spraying procedure.** The spraying procedure shall use low-volume spray application.~~

~~**2404.8.1.2 Drying apparatus.** Fixed drying apparatus shall comply with this chapter and the applicable provisions of Chapter 30. Where recirculation ventilation is provided in accordance with Section 2404.9.2, the heating system shall not be within the recirculation air path.~~

~~**2404.8.1.2.1 Interlocks.** The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:~~

1. ~~Prevent operation of the spraying apparatus while drying operations are in progress.~~
2. ~~Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based on completing not fewer than four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.~~
3. ~~Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.~~
4. ~~Shut off the drying apparatus automatically if the discharge temperature of the air heater exceeds the maximum discharge air temperature allowed in accordance with the heater's listing or 221°F (105°C).~~

~~**2404.8.1.2.2 Portable infrared apparatus.** Where a portable infrared drying apparatus is used, electrical wiring and portable infrared drying equipment shall comply with NFPA 70. Electrical equipment located within 18 inches (457 mm) of floor level shall be *approved* for~~

Class I, Division 2, hazardous locations. Metallic parts of drying apparatus shall be electrically bonded and grounded. During spraying operations, portable drying apparatus and electrical connections and wiring thereto shall not be located within spray booths, spray rooms or other areas where spray residue would be deposited thereon.

2404.8.2 Illumination. Where spraying spaces, spray rooms or spray booths are illuminated through glass panels or other transparent materials, only fixed luminaires shall be utilized as a source of illumination.

2404.8.2.1 Glass panels. Panels for luminaires or for observation shall be of heat treated glass, wired glass or hammered wire glass and shall be sealed to confine vapors, mists, residues, dusts and deposits to the flammable vapor area. Panels for luminaires shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding 221°F (105°C).

2404.8.2.2 Exterior luminaires. Luminaires attached to the walls or ceilings of a flammable vapor area, but outside of any classified area and separated from the flammable vapor areas by vapor tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.

2404.8.2.3 Integral luminaires. Luminaires that are an integral part of the walls or ceiling of a flammable vapor area are allowed to be separated from the flammable vapor area by glass panels that are an integral part of the luminaire. Such luminaires shall be *listed* for use in Class I, Division 2, or Class II, Division 2, locations, whichever is applicable, and shall be suitable for accumulations of deposits of combustible residues. Such luminaires are allowed to be serviced from inside the flammable vapor area.

2404.8.2.4 Portable electric lamps. Portable electric lamps shall not be used in flammable vapor areas during spraying operations. Portable electric lamps used during cleaning or repairing operations shall be of a type *approved* for hazardous locations.

2404.9.1 Operation. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. Spraying equipment shall be interlocked with the ventilation of the flammable vapor areas such that spraying operations cannot be conducted unless the ventilation system is in operation.

2404.9.2 Recirculation. Air exhausted from spraying operations shall not be recirculated. **Exceptions:**

1. Air exhausted from spraying operations is allowed to be recirculated as makeup air for unmanned spray operations, provided that all of the following conditions exist:
   1.1. The solid particulate has been removed.
   1.2. The vapor concentration is less than 25 percent of the LFL.
   1.3. *Approved* equipment is used to monitor the vapor concentration.
   1.4. When the vapor concentration exceeds 25 percent of the LFL, both of the following shall occur:
      1.4.1. An alarm shall sound.
      1.4.2. Spray operations shall automatically shut down.
   1.5. In the event of shutdown of the vapor concentration monitor, 100 percent of the air volume specified in Section 509 of the International Mechanical Code is automatically exhausted.
2. Air exhausted from spraying operations is allowed to be recirculated as makeup air to manned spraying operations where all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not pose a life safety hazard to personnel inside the spray booth, spraying space or spray room.

2404.9.5 Independent ducts. Each spray booth and spray room shall have an independent exhaust duct system discharging to the outside. **Exceptions:**

1. Multiple spray booths having a combined frontal area of 18 square feet (1.67 m^2) or less are allowed to have a common exhaust where identical spray finishing material is used in each booth. If more than one fan serves one booth, fans shall be interconnected such that all fans will operate simultaneously.
2. Where treatment of exhaust is necessary for air pollution control or for energy conservation, ducts shall be allowed to be manifolded if all of the following conditions are met:
    2.1. The sprayed materials used are compatible and will not react or cause ignition of the residue in the ducts.
    2.2. Nitrocellulose-based finishing material shall not be used.
    2.3. A filtering system shall be provided to reduce the amount of overspray carried into the duct manifold.
    2.4. Automatic sprinkler protection shall be provided at the junction of each booth exhaust with the manifold, in addition to the protection required by this chapter.

2404.9.6 Termination point. The termination point for exhaust ducts discharging to the atmosphere shall be not less than the following distances:

1. Ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from the *lot line*; 10 feet (3048 mm) from openings into the building; 6 feet (1829 mm) from *exterior walls* and roofs; 30 feet (9144 mm) from combustible walls or openings into the building that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. Other product-conveying outlets: 10 feet (3048 mm) from the *lot line*; 3 feet (914 mm) from *exterior walls* and roofs; 10 feet (3048 mm) from openings into the building; 10 feet (3048 mm) above adjoining grade.

2404.9.7 Fan motors and belts. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or nonsparking or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct or booth unless the belt and pulley within the duct are tightly enclosed.

2404.9.8 Filters. Air intake filters that are part of a wall or ceiling assembly shall be *listed* as Class I or II in accordance with UL 900. Exhaust filters shall be required.

2404.9.8.1 Supports. Supports and holders for filters shall be constructed of noncombustible materials.

2404.9.8.2 Attachment. Overspray collection filters shall be readily removable and able to be accessed for cleaning or replacement.

2404.9.8.3 Maintaining air velocity. Visible gauges, audible alarms or pressure-activated devices shall be installed to indicate or ensure that the required air velocity is maintained.

2404.9.8.5 Filter disposal. Discarded filter pads shall be immediately removed to a safe, detached location or placed in a noncombustible container with a tight fitting lid and disposed of properly.

2404.9.8.6 Spontaneous ignition. Spray booths using dry filters shall not be used for spraying materials that are highly susceptible to spontaneous heating and ignition. Filters shall be changed prior to spraying materials that could react with other materials previously collected. An example of a potentially reactive combination includes lacquer when combined with varnishes, stains or primers.

2404.9.8.7 Waterwash spray booths. Waterwash spray booths shall be of an *approved* design so as to prevent excessive accumulation of deposits in ducts and residue at duct outlets. Such booths shall be arranged so that air and overspray are drawn through a continuously flowing water curtain before entering an exhaust duct to the building exterior.

2404.10 Interlocks. Interlocks for spray application finishes shall be in accordance with Sections 2404.10.1 through 2404.10.2.

~~**2404.10.1 Automated spray application operations.** Where protecting automated spray application operations, *automatic fire-extinguishing systems* shall be equipped with an *approved* interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a *fire alarm system*, discharge of the *automatic fire-extinguishing system* shall also activate the building alarm notification appliances.~~

~~**2404.10.1.1 Alarm station.** A manual fire alarm and emergency system shutdown station shall be installed to serve each flammable vapor area. When activated, the station shall accomplish the functions indicated in Section 2404.10.1.~~

~~**2404.10.1.2 Alarm station location.** Not less than one manual fire alarm and emergency system shutdown station shall be provided with *ready access* for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an *exit* from the area.~~

~~**2404.10.2 Ventilation interlock prohibited.** Air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition. **Exception:** Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.~~

Revise as follows:

~~**2404.11**~~ **2403.4 Limited spraying spaces.** Limited spraying spaces shall comply with Sections ~~2404.11.1 through 2404.11.4~~ 2403.4.1 through 2403.4.4.

~~**2404.11.1**~~ **2403.4.1 Job size.** The aggregate surface area to be sprayed shall not exceed 9 square feet (0.84 m^2).

~~**2404.11.2**~~ **2403.4.2 Frequency.** Spraying operations shall not be of a continuous nature.

~~**2404.11.3**~~ **2403.4.3 Ventilation.** Positive mechanical ventilation providing not fewer than six complete air changes per hour shall be installed. Such system shall meet the requirements of this code for handling flammable vapor areas. Explosion venting is not required.

~~**2404.11.4**~~ **2403.4.4 Electrical wiring.** Electrical wiring within 10 feet (3048 mm) of the floor and 20 feet (6096 mm) horizontally of the limited spraying space shall be designed for Class I, Division 2 locations in accordance with NFPA 70.

SECTION ~~2406~~ 2404
POWDER COATING

~~**2406.1**~~ **2404.1 General.** The design, construction, protection, operation and maintenance of powder coating operations and equipment shall be in accordance with NFPA 33.~~Operations using finely ground particles of protective finishing material applied in dry powder form by a fluidized bed, an electrostatic fluidized bed, powder spray guns or electrostatic powder spray guns shall comply with Sections 2406.2 through 2406.7. In addition, Section 2407 shall apply to fixed electrostatic equipment used in powder coating operations.~~

~~**2406.2**~~ **2404.2 Location.** Powder coating operations shall be conducted in enclosed powder coating rooms, enclosed powder coating facilities that are ventilated or ventilated spray booths.

~~**2406.4**~~ **2404.2 Fire protection.** Areas used for powder coating shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9 and NFPA 33.

~~**2406.3 Construction of powder coating rooms and booths.** Powder coating rooms shall be constructed of noncombustible materials. Spray booths shall be constructed in accordance with Section 2404.5.3. **Exception:** *Listed* spray booth assemblies that are constructed of other materials shall be allowed.~~

~~**2406.4.1 Additional protection for fixed systems.** Automated powder application equipment shall be protected by the installation of an *approved*, supervised flame detection apparatus that shall react to the presence of flame within 0.5 second and shall accomplish all of~~

~~the following:~~

1. ~~Shutting down of energy supplies (electrical and compressed air) to conveyor, ventilation, application, transfer and powder collection equipment.~~
2. ~~Closing of segregation dampers in associated ductwork to interrupt airflow from application equipment to powder collectors.~~
3. ~~Activation of an alarm that is audible throughout the powder coating room or booth.~~

~~2406.4.2 Fire extinguishers.~~ ~~Portable fire extinguishers complying with Section 906 shall be provided for areas used for powder coating in accordance with the requirements for an extra-hazard occupancy.~~

~~2406.5 Operation and maintenance.~~ ~~Powder coating areas shall be kept free from the accumulation of powder coating dusts, including horizontal surfaces such as ledges, beams, pipes, hoods, booths and floors.~~

~~2406.5.1 Cleaning.~~ ~~Surfaces shall be cleaned in such a manner so as to avoid scattering dusts to other places or creating dust clouds. Vacuum sweeping equipment shall be of a type *approved* for use in hazardous locations.~~

~~2406.6 Sources of ignition.~~ ~~Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2406.6.1 through 2406.6.4.~~

~~2406.6.1 Drying, curing and fusion equipment.~~ ~~Drying, curing and fusion equipment shall comply with Chapter 30.~~

~~2406.6.2 Spark-producing metals.~~ ~~Iron or spark-producing metals shall be prevented from being introduced into the powders being applied by magnetic separators, filter-type separators or by other *approved* means.~~

~~2406.6.3 Preheated parts.~~ ~~When parts are heated prior to coating, the temperature of the parts shall not exceed the ignition temperature of the powder to be used.~~

~~2406.6.4 Grounding and bonding.~~ ~~Precautions shall be taken to minimize the possibility of ignition by static electrical sparks through static bonding and grounding, where possible, of powder transport, application and recovery equipment.~~

~~2406.7 Ventilation.~~ ~~Exhaust ventilation shall be sufficient to maintain the atmosphere below one-half the minimum explosive concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.~~

SECTION 2405
DIPPING OPERATIONS

Revise as follows:

2405.1 General. The design, construction, protection, operation and maintenance of dipping operations and equipment~~Dip-tank operations~~ shall comply with the requirements of NFPA 34 ~~Section 2403 and Sections 2405.2 through 2405.11~~.

2405.2 Location of dip-tank operations. Dip-tank operations conducted in buildings used for Group A, I or R occupancies shall be located in a room designed for that purpose, equipped with an *approved automatic sprinkler system* and separated vertically and horizontally from other areas in accordance with the *International Building Code*.

Revise as follows:

~~2405.3 Construction of dip tanks.~~ ~~Dip tanks shall be constructed in accordance with Sections 2405.3.1 through 2405.3.4.3 and NFPA 34. Dip tanks, including drain boards, shall be constructed of noncombustible material and their supports shall be of heavy metal, reinforced concrete or masonry.~~

2405.3.1 Overflow. Dip tanks greater than 150 gallons (568 L) in capacity or 10 square feet (0.93 m^2) in liquid surface area shall be equipped with a trapped overflow pipe leading to an *approved* location outside the building. The bottom of the overflow connection shall be not less than 6 inches (152 mm) below the top of the tank.

2405.3.2 Bottom drains. Dip tanks greater than 500 gallons (1893 L) in liquid capacity shall be equipped with bottom drains that are arranged to automatically and manually drain the tank quickly in the event of a fire unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Access to the manual operation shall be from a safe location. Where gravity flow is not practicable, automatic pumps shall be provided. Such drains shall be trapped and discharged to a closed, vented salvage tank or to an *approved* outside location.

Exception: Dip tanks containing Class IIIB *combustible liquids* where the liquids are not heated above room temperature and the process area is protected by automatic sprinklers.

2405.3.3 Dipping liquid temperature control. Protection against the accumulation of vapors, self ignition and excessively high temperatures shall be provided for dipping liquids that are heated directly or heated by the surfaces of the object being dipped.

2405.3.4 Dip tank covers. Dip tank covers allowed by Section 2405.4.1 shall be capable of manual operation and shall be automatic closing by *approved* automatic closing devices designed to operate in the event of a fire.

2405.3.4.1 Construction. Covers shall be constructed of noncombustible material or be of a tin clad type with enclosing metal applied with locked joints.

2405.3.4.2 Supports. Chain or wire rope shall be utilized for cover supports or operating mechanisms.

2405.3.4.3 Closed covers. Covers shall be kept closed when tanks are not in use.

2405.4 Fire protection. Dip tank operations shall be protected in accordance with Sections 2405.4.1 through 2405.4.2.

2405.4.1 Fixed fire-extinguishing equipment. An *approved automatic fire-extinguishing system* or dip tank cover in accordance with Section 2405.3.4 shall be provided for the following dip tanks:

1. Dip tanks less than 150 gallons (568 L) in capacity or 10 square feet (0.93 m^2) in liquid surface area.
2. Dip tanks containing a liquid with a *flash point* below 110°F (43°C) used in such manner that the liquid temperature could equal or be greater than its *flash point* from artificial or natural causes, and having both a capacity of more than 10 gallons (37.9 L) and a liquid surface area of more than 4 square feet (0.37 m^2).

2405.4.1.1 Fire-extinguishing system. An *approved automatic fire-extinguishing system* shall be provided for dip tanks with a 150-gallon (568 L) or more capacity or 10 square feet (0.93 m^2) or larger in a liquid surface area. Fire-extinguishing system design shall be in accordance with NFPA 34.

2405.4.2 Portable fire extinguishers. Areas in the vicinity of dip tanks shall be provided with portable fire extinguishers complying with Section 906 and suitable for *flammable* and *combustible liquid* fires as specified for extra (high) hazard occupancies.

2405.5 Housekeeping, maintenance and storage of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4.

2405.6 Sources of ignition. Control of sources of ignition shall be in accordance with Section 2403.2.

2405.7 Ventilation of flammable vapor areas. Flammable vapor areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors. Required ventilation systems shall be arranged such that the failure of any ventilating fan shall automatically stop the dipping conveyor system.

2405.8 Conveyor interlock. Dip tanks utilizing a conveyor system shall be arranged such that in the event of a fire, the conveyor system

~~shall automatically cease motion and the required tank bottom drains shall open.~~

~~**2405.9 Hardening and tempering tanks.** Hardening and tempering tanks shall comply with Sections 2405.3 through 2405.3.3, 2405.9.4 and 2405.8, but shall be exempt from other provisions of Section 2405.~~

~~**2405.9.1 Location.** Tanks shall be located as far as practical from furnaces and shall not be located on or near combustible floors.~~

~~**2405.9.2 Hoods.** Tanks shall be provided with a noncombustible hood and vent or other *approved* venting means, terminating outside of the structure to serve as a vent in case of a fire. Such vent ducts shall be treated as flues and proper clearances shall be maintained from combustible materials.~~

~~**2405.9.3 Alarms.** Tanks shall be equipped with a high-temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches 50°F (10°C) below the *flash point*.~~

~~**2405.9.4 Fire protection.** Hardening and tempering tanks greater than 500 gallons (1893 L) in capacity or 25 square feet (2.3 m^2) in liquid surface area shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9.~~

~~**2405.9.5 Use of air pressure.** Air under pressure shall not be used to fill or agitate oil in tanks.~~

~~**2405.10 Flow-coating operations.** Flow-coating operations shall comply with the requirements for dip tanks. The area of the sump and any areas on which paint flows shall be considered to be the area of a dip tank.~~

~~**2405.10.1 Paint supply.** Paint shall be supplied by a gravity tank not exceeding 10 gallons (38 L) in capacity or by direct low-pressure pumps arranged to shut down automatically in case of a fire by means of *approved* heat-actuated devices.~~

~~**2405.11 Roll-coating operations.** Roll-coating operations shall comply with Section 2405.10. In roll-coating operations utilizing *flammable* or *combustible liquids*, sparks from static electricity shall be prevented by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by the installation of static collectors, or by maintaining a conductive atmosphere such as a high relative humidity.~~

SECTION ~~2407~~ 2406
ELECTROSTATIC APPARATUS

~~**2407.1**~~ **2406.1 General.** Electrostatic apparatus and devices used in connection with paint-spraying and paint-*detearing* operations shall be ~~of an *approved* type~~ in accordance with the requirements of NFPA 33.

~~**2407.2 Location and clear space.** A space of not less than twice the sparking distance shall be maintained between goods being painted or *deteared* and electrodes, electrostatic atomizing heads or conductors. A sign stating the sparking distance shall be conspicuously posted near the assembly.~~

~~**Exception:** Portable electrostatic paint spraying apparatus *listed* for use in Class I, Division 1, locations.~~

~~**2407.3 Construction of equipment.** Electrodes and electrostatic atomizing heads shall be of *approved* construction, rigidly supported in permanent locations and effectively insulated from ground. Insulators shall be nonporous and noncombustible.~~

~~**Exception:** Portable electrostatic paint spraying apparatus *listed* for use in Class I, Division 1, locations.~~

~~**2407.3.1 Barriers.** Booths, fencing, railings or guards shall be placed about the equipment such that either by their location or character, or both, isolation of the process is maintained from plant storage and personnel. Railings, fencing and guards shall be of conductive material, adequately grounded, and not less than 5 feet (1524 mm) from processing equipment.~~

~~**Exception:** Portable electrostatic paint spraying apparatus *listed* for use in Class I, Division 1, locations.~~

~~**2407.4 Fire protection.** Areas used for electrostatic spray finishing with fixed equipment shall be protected with an *approved automatic*~~

~~*fire-extinguishing system* complying with Chapter 9 and Section 2407.4.1.~~

~~**2407.4.1 Protection for automated liquid electrostatic spray application equipment.** Automated liquid electrostatic spray application equipment shall be protected by the installation of an *approved*, supervised flame detection apparatus that shall, in the event of ignition, react to the presence of flame within 0.5 second and shall accomplish all of the following:~~

1. ~~Activation of a local alarm in the vicinity of the spraying operation and activation of the building alarm system, if such a system is provided.~~
2. ~~Shutting down of the coating material delivery system.~~
3. ~~Termination of all spray application operations.~~
4. ~~Stopping of conveyors into and out of the flammable vapor areas.~~
5. ~~Disconnection of power to the high-voltage elements in the flammable vapor areas and disconnection of power to the system.~~

~~**2407.5 Housekeeping, maintenance and storage of hazardous materials.** Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4 and Sections 2407.5.1 and 2407.5.2.~~

~~**2407.5.1 Maintenance.** Insulators shall be kept clean and dry. Drip plates and screens subject to paint deposits shall be removable and taken to a safe place for cleaning. Grounds and bonding means for the paint spraying apparatus and all associated equipment shall be periodically cleaned and maintained free of overspray.~~

~~**2407.5.2 Signs.** Signs shall be posted to provide the following information:~~

1. ~~Designate the process zone as dangerous with respect to fire and accident.~~
2. ~~Identify the grounding requirements for all electrically conductive objects in the flammable vapor area, including persons.~~
3. ~~Restrict access to qualified personnel only.~~

~~**2407.6 Sources of ignition.** Transformers, power packs, control apparatus and all other electrical portions of the equipment, except high-voltage grids and electrostatic atomizing heads and connections, shall be located outside of the flammable vapor areas or shall comply with Section 2403.2.~~

~~**2407.7 Ventilation.** The flammable vapor area shall be ventilated in accordance with Section 2404.9.~~

~~**2407.8 Emergency shutdown.** Electrostatic apparatus shall be equipped with automatic controls operating without time delay to disconnect the power supply to the high-voltage transformer and signal the operator under any of the following conditions:~~

1. ~~Stoppage of ventilating fans or failure of ventilating equipment from any cause.~~
2. ~~Stoppage of the conveyor carrying articles past the high-voltage grid.~~
3. ~~Occurrence of a ground or an imminent ground at any point of the high-voltage system.~~
4. ~~Reduction of clearance below that required in Section 2407.2.~~

~~**2407.9 Ventilation interlock.** Hand electrostatic equipment shall be interlocked with the ventilation system for the spraying area so that the equipment cannot be operated unless the ventilating system is in operation.~~

SECTION ~~2408~~ 2407
ORGANIC PEROXIDES AND DUAL-COMPONENT COATINGS

~~**2408.1**~~ **2407.1 General.** Spraying operations involving the use of *organic peroxides* and other dual-component coatings shall be in accordance with the requirements of NFPA 33~~Section 2403 and Sections 2408.2 through 2408.5~~.

~~**2408.2 Use of organic peroxide coatings.** Spraying operations involving the use of *organic peroxides* and other dual-component coatings shall be conducted in *approved* sprinklered spray booths complying with Section 2404.5.3.~~

~~**2408.3 Equipment.** Spray guns and related handling equipment used with *organic peroxides* shall be of a type manufactured for such use.~~

~~**2408.3.1 Pressure tanks.** Separate pressure vessels and inserts specifically for the application shall be used for the resin and for the *organic peroxide*, and shall not be interchanged. Organic peroxide pressure tank inserts shall be constructed of stainless steel or polyethylene.~~

~~**2408.4 Housekeeping, maintenance, storage and use of hazardous materials.** Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2408.4.1 through 2408.4.7.~~

~~**2408.4.1 Contamination prevention.** *Organic peroxide* initiators shall not be contaminated with foreign substances.~~

~~**2408.4.2 Spilled material.** Spilled *organic peroxides* shall be promptly removed and any residue thereof promptly eliminated. Spilled material absorbed by using a noncombustible absorbent shall be promptly disposed of in accordance with the manufacturer's recommendation.~~

~~**2408.4.3 Residue control.** Materials shall not be contaminated by dusts and overspray residues resulting from the sanding or spraying of finishing materials containing *organic peroxides.*~~

~~**2408.4.4 Handling.** Handling of *organic peroxides* shall be conducted in a manner that avoids shock and friction that produces decomposition and violent reaction hazards.~~

~~**2408.4.5 Mixing.** *Organic peroxides* shall not be mixed directly with accelerators or promoters.~~

~~**2408.4.6 Personnel qualifications.** Personnel working with *organic peroxides* and dual-component coatings shall be specifically trained to work with these materials.~~

~~**2408.4.7**~~ **2407.2 Storage.** The storage of *organic peroxides* shall comply with Chapter 62.

~~**2408.5 Sources of ignition.** Only nonsparking tools shall be used in areas where *organic peroxides* are stored, mixed or applied.~~

SECTION ~~2409~~ 2408
INDOOR MANUFACTURING OF REINFORCED PLASTICS

~~**2409.1**~~ **2408.1 General.** Indoor manufacturing processes involving spray or hand application of reinforced plastics and using more than 5 gallons (19 L) of resin in a 24-hour period shall be in accordance with NFPA 33~~Sections 2409.2 through 2409.6.1~~.

~~**2409.2 Resin application equipment.** Equipment used for spray application of resin shall be installed and used in accordance with Section 2408 and Sections 2409.3 through 2409.6.1.~~

~~**2409.3 Fire protection.** Resin application areas shall be protected by an *automatic sprinkler system*. The sprinkler system design shall be not less than that required for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (279 m^2). Where the materials or storage arrangements are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.~~

~~**2409.4 Housekeeping, maintenance, storage and use of hazardous materials.** Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2409.4.1 through 2409.4.3.~~

~~**2409.4.1 Handling of excess catalyzed resin.** A noncombustible, open-top container shall be provided for disposal of excess catalyzed resin. Excess catalyzed resin shall be drained into the container while still in the liquid state. Enough water shall be provided in the container to maintain a minimum 2-inch (51-mm) water layer over the contained resin.~~

~~**2409.4.2 Control of overchop.** In areas where chopper guns are used, exposed wall and floor surfaces shall be covered with paper, polyethylene film or other *approved* material to allow for removal of overchop. Overchop shall be allowed to cure for not less than 4 hours prior to removal.~~

~~**2409.4.2.1 Disposal.** Following removal, used wall and floor covering materials required by Section 2409.4.2 shall be placed in a noncombustible container and removed from the facility.~~

240~~8~~.2~~9~~.4.3 Storage ~~and use of hazardous materials~~. Storage ~~and use of~~ *organic peroxides* shall be in accordance with ~~Section 2408 and~~Chapter 62. Storage and use of *flammable* and *combustible liquids* shall be in accordance with Chapter 57. Storage and use of unstable (reactive) materials shall be in accordance with Chapter 66.

~~**2409.5 Sources of ignition in resin application areas.** Sources of ignition in resin application areas shall comply with Section 2403.2.~~

~~**2409.6 Ventilation.** Mechanical ventilation shall be provided throughout resin application areas in accordance with Section 2404.9. The ventilation rate shall be adequate to maintain the concentration of flammable vapors in the resin application area at or below 25 percent of the LFL. **Exception:** Mechanical ventilation is not required for buildings that have 75 percent of the perimeter unenclosed.~~

~~**2409.6.1 Local ventilation.** Local ventilation shall be provided inside of workpieces where personnel will be under or inside of the workpiece.~~

SECTION ~~2410~~ 2409
FLOOR SURFACING AND FINISHING OPERATIONS

~~**2410.1**~~ **2409.1 Scope.** Floor surfacing and finishing operations exceeding 350 square feet (33 m^2) and using Class I or II liquids shall comply with Sections ~~2410.2 through 2410.5~~ 2409.2 through 2409.5.

~~**2410.2**~~ **2409.2 Mechanical system operation.** Heating, ventilation and air-conditioning systems shall not be operated during resurfacing or refinishing operations or within 4 hours of the application of *flammable* or *combustible liquids*.

~~**2410.3**~~ **2409.3 Business operation.** Floor surfacing and finishing operations shall not be conducted while an establishment is open to the public.

~~**2410.4**~~ **2409.4 Ignition sources.** The power shall be shut down to all electrical sources of ignition within the flammable vapor area, unless those devices are classified for use in Class I, Division 1, hazardous locations.

~~**2410.5**~~ **2409.5 Ventilation.** To prevent the accumulation of flammable vapors, mechanical ventilation at a minimum rate of 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of area being finished shall be provided. Such exhaust shall be by *approved* temporary or portable means. Vapors shall be exhausted to the exterior of the building.

SECTION ~~2403~~ 2410
STORAGE, HANDLING AND USE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS ~~PROTECTION OF OPERATIONS~~

~~**2403.3**~~ **2410.1 Storage, use and handling of flammable and combustible liquids.** The storage, use and handling of *flammable* and *combustible liquids* shall be in accordance with this section~~, and~~ Chapter 57 and NFPA 33.

~~2403.3.1~~ 24010.1.1 **Use.** Containers supplying spray nozzles shall be of a closed type or provided with metal covers that are kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons (37.9 L) in capacity.

~~2403.3.2~~ 2410.1.2 **Valves.** Containers and piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when hoses are not in use.

~~2403.3.3~~ 2410.1.3 **Pumped liquid supplies.** Where *flammable* or *combustible liquids* are supplied to spray nozzles by positive displacement pumps, pump discharge lines shall be provided with an *approved* relief valve discharging to pump suction or a safe detached location.

~~2404.3.4~~ 2410.1.4 **Liquid transfer.** Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers. Not less than one container shall be grounded. Piping systems for Class I and II liquids shall be permanently grounded.

~~2403.3.5~~ 2410.1.5 **Class I liquids as solvents.** Class I liquids used as solvents shall be used in spray gun and equipment cleaning machines that have been *listed* and *approved* for such purpose or shall be used in spray booths or spray rooms in accordance with Sections ~~2403.3.5.1 and 2403.3.5.2~~ 2410.1.5.1 and 2410.1.5.2.

~~2403.3.5.1~~ 2410.1.5.1 **Listed devices.** Cleaning machines for spray guns and equipment shall not be located in areas open to the public and shall be separated from ignition sources in accordance with their listings or by a distance of 3 feet (914 mm), whichever is greater. The quantity of solvent used in a machine shall not exceed the design capacity of the machine.

~~2403.3.5.2~~ 2410.1.5.2 **Within spray booths and spray rooms.** Where solvents are used for cleaning spray nozzles and auxiliary equipment within spray booths and spray rooms, the ventilating equipment shall be operated during cleaning.

~~2403.3.6~~ 2410.1.6 **Class II and III liquids.** Solvents used outside of spray booths, spray rooms or *listed* and *approved* spray gun and equipment cleaning machines shall be restricted to Class II and III liquids.

~~**2403.1 General.** Operations covered by this chapter shall be protected as required by Sections 2403.2 through 2403.4.4.~~

~~**2403.2 Sources of ignition.** Protection against sources of ignition shall be provided in accordance with Sections 2403.2.1 through 2403.2.8.~~

~~**2403.2.1 Electrical wiring and equipment.** Electrical wiring and equipment shall comply with this chapter and NFPA 70.~~

~~**2403.2.1.1 Flammable vapor areas.** Electrical wiring and equipment in flammable vapor areas shall be of an explosionproof type *approved* for use in such hazardous locations. Such areas shall be considered to be Class I, Division 1, or Class II, Division 1, hazardous locations in accordance with NFPA 70.~~

~~**2403.2.1.2 Areas subject to deposits of residues.** Electrical equipment, flammable vapor areas or drying operations that are subject to splashing or dripping of liquids shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors.~~ **Exceptions:**

1. ~~This provision shall not apply to wiring in rigid conduit, threaded boxes or fittings not containing taps, splices or terminal connections.~~
2. ~~This provision shall not apply to electrostatic equipment allowed by Section 2407.~~

~~In resin application areas, electrical wiring and equipment that is subject to deposits of combustible residues shall be *listed* for such exposure and shall be installed as required for hazardous (classified) locations. Electrical wiring and equipment not subject to deposits of combustible residues shall be installed as required for ordinary hazard locations.~~

2403.2.1.3 Areas adjacent to spray booths. Electrical wiring and equipment located outside of, but within 3 feet (914 mm) of openings in a spray booth or a spray room, shall be *approved* for Class I, Division 2, or Class II, Division 2, hazardous locations, whichever is applicable.

2403.2.1.4 Areas subject to overspray deposits. Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors in accordance with NFPA 70. **Exceptions:**

1. Wiring in rigid conduit.
2. Boxes or fittings not containing taps, splices or terminal connections.
3. Equipment allowed by Sections 2404 and 2407 and Chapter 30.

2403.2.2 Open flames and sparks. Open flames and spark-producing devices shall not be located in flammable vapor areas and shall not be located within 20 feet (6096 mm) of such areas unless separated by a permanent partition. **Exception:** Drying and baking apparatus complying with Section 2404.8.1.2.

2403.2.3 Hot surfaces. Heated surfaces having a temperature sufficient to ignite vapors shall not be located in flammable vapor areas. Space-heating appliances, steam pipes or hot surfaces in a flammable vapor area shall be located such that they are not subject to accumulation of deposits of combustible residues. **Exception:** Drying apparatus complying with Section 2404.8.1.2.

2403.2.4 Equipment enclosures. Equipment or apparatus that is capable of producing sparks or particles of hot metal that would fall into a flammable vapor area shall be totally enclosed.

2403.2.5 Grounding. Metal parts of spray booths, exhaust ducts and piping systems conveying Class I or II liquids shall be electrically grounded in accordance with NFPA 70. Metallic parts located in resin application areas, including but not limited to exhaust ducts, ventilation fans, spray application equipment, workpieces and piping, shall be electrically grounded.

2403.2.6 Smoking prohibited. Smoking shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish processes. "No Smoking" signs complying with Section 310 shall be conspicuously posted in such areas.

2403.2.8 Powered industrial trucks. Powered industrial trucks used in electrically classified areas shall be *listed* for such use.

2403.2.7 Welding warning signs. Welding, cutting and similar spark-producing operations shall not be conducted in or adjacent to flammable vapor areas or dipping or coating operations unless precautions have been taken to provide safety. Conspicuous signs with the following warning shall be posted in the vicinity of flammable vapor areas, dipping operations and paint storage rooms:

NO WELDING
THE USE OF WELDING OR CUTTING
EQUIPMENT IN OR NEAR THIS AREA
IS DANGEROUS BECAUSE OF FIRE
AND EXPLOSION HAZARDS. WELDING
AND CUTTING SHALL BE DONE ONLY
UNDER THE SUPERVISION OF THE
PERSON IN CHARGE.

2403.4 Operations and maintenance. Flammable vapor areas, exhaust fan blades and exhaust ducts shall be kept free from the accumulation of deposits of combustible residues. Where excessive residue accumulates in such areas, spraying operations shall be discontinued until conditions are corrected.

2403.4.1 Tools. Scrapers, spuds and other tools used for cleaning purposes shall be constructed of nonsparking materials.

~~**2403.4.2 Residue.** Residues removed during cleaning and debris contaminated with residue shall be immediately removed from the premises and properly disposed.~~

~~**2403.4.3 Waste cans.** *Approved* metal waste cans equipped with self closing lids shall be provided wherever rags or waste are impregnated with finishing material. Such rags and waste shall be deposited therein immediately after being utilized. The contents of waste cans shall be properly disposed of not less than once daily and at the end of each shift.~~

~~**2403.4.4 Solvent recycling.** Solvent distillation equipment used to recycle and clean dirty solvents shall comply with Section 5705.4.~~

NFPA

NFPA
NFPA
1 Batterymarch Park
Quincy, MA 02169-7471

33— ~~21~~ 24	Standard for Spray Application Using Flammable or Combustible Materials
34— ~~21~~ 24	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids

Reason: The current chapter includes some, but not all of the safety requirements for spray finishing, powder coating, and dipping. This edit removed items that are duplicated in NFPA 33 and NFPA 34 and directs the user to the complete set of safety requirements in the appropriate NFPA standard that would be challenging to repeat within this Chapter.

Specific fire protection requirements for the various operations and enclosures that involve spray and dipping operations can be found in the referenced NFPA documents and have been removed from this chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in an NFPA standard that fully addresses the hazards.

F184-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as the committee was not in favor of such a wholesale reference to NFPA 33 and 34. Such revisions need to be incremental. (Vote 14-0)

F184-24

Individual Consideration Agenda

Comment 1:

IFC: 2403.2, 2403.2.1, 2403.2.1.1, 2403.2.1.2, 2403.2.1.3, 2403.2.1.4, 2403.2.2, 2403.2.3, 2403.2.4, 2403.2.6, 2403.2.7, 2403.2.8, 2403.2.5

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2403.2 Sources of ignition. Protection against sources of ignition shall be provided in accordance with Sections 2403.2.1 through 2403.2.4~~8~~.

2403.2.1 Electrical wiring and equipment. Electrical wiring and equipment shall comply with this chapter and the applicable provisions of NFPA 33, NFPA 34 and NFPA 70.

Delete without substitution:

~~**2403.2.1.1 Flammable vapor areas.** Electrical wiring and equipment in flammable vapor areas shall be of an explosionproof type *approved* for use in such hazardous locations. Such areas shall be considered to be Class I, Division 1, or Class II, Division 1, hazardous locations in accordance with NFPA 70.~~

~~**2403.2.1.2 Areas subject to deposits of residues.** Electrical equipment, flammable vapor areas or drying operations that are subject to splashing or dripping of liquids shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors. **Exceptions:**~~

1. ~~This provision shall not apply to wiring in rigid conduit, threaded boxes or fittings not containing taps, splices or terminal connections.~~
2. ~~This provision shall not apply to electrostatic equipment allowed by Section 2407.~~

~~In resin application areas, electrical wiring and equipment that is subject to deposits of combustible residues shall be *listed* for such exposure and shall be installed as required for hazardous (classified) locations. Electrical wiring and equipment not subject to deposits of combustible residues shall be installed as required for ordinary hazard locations.~~

~~**2403.2.1.3 Areas adjacent to spray booths.** Electrical wiring and equipment located outside of, but within 3 feet (914 mm) of openings in a spray booth or a spray room, shall be *approved* for Class I, Division 2, or Class II, Division 2, hazardous locations, whichever is applicable.~~

~~**2403.2.1.4 Areas subject to overspray deposits.** Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically *approved* for locations containing deposits of readily ignitable residue and explosive vapors in accordance with NFPA 70. **Exceptions:**~~

1. ~~Wiring in rigid conduit.~~
2. ~~Boxes or fittings not containing taps, splices or terminal connections.~~
3. ~~Equipment allowed by Sections 2404 and 2407 and Chapter 30.~~

~~**2403.2.2 Open flames and sparks.** Open flames and spark-producing devices shall not be located in flammable vapor areas and shall not be located within 20 feet (6096 mm) of such areas unless separated by a permanent partition. **Exception:** Drying and baking apparatus complying with Section 2404.8.1.2.~~

~~**2403.2.3 Hot surfaces.** Heated surfaces having a temperature sufficient to ignite vapors shall not be located in flammable vapor areas. Space-heating appliances, steam pipes or hot surfaces in a flammable vapor area shall be located such that they are not subject to accumulation of deposits of combustible residues. **Exception:** Drying apparatus complying with Section 2404.8.1.2.~~

~~**2403.2.4 Equipment enclosures.** Equipment or apparatus that is capable of producing sparks or particles of hot metal that would fall into~~

~~a flammable vapor area shall be totally enclosed.~~

Revise as follows:

2403.2.2 ~~**2403.2.6**~~ **Smoking prohibited.** Smoking shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish processes. “No Smoking” signs complying with Section 310 shall be conspicuously posted in such areas.

2403.2.3 ~~**2403.2.7**~~ **Welding warning signs.** Welding, cutting and similar spark-producing operations shall not be conducted in or adjacent to flammable vapor areas or dipping or coating operations unless precautions have been taken to provide safety. Conspicuous signs with the following warning shall be posted in the vicinity of flammable vapor areas, dipping operations and paint storage rooms:NO WELDING
THE USE OF WELDING OR CUTTING
EQUIPMENT IN OR NEAR THIS AREA
IS DANGEROUS BECAUSE OF FIRE
AND EXPLOSION HAZARDS. WELDING
AND CUTTING SHALL BE DONE ONLY
UNDER THE SUPERVISION OF THE
PERSON IN CHARGE.

2403.2.4 ~~**2403.2.8**~~ **Powered industrial trucks.** Powered industrial trucks used in electrically classified areas shall be *listed* for such use.

Delete without substitution:

~~**2403.2.5 Grounding.** Metal parts of spray booths, exhaust ducts and piping systems conveying Class I or II liquids shall be electrically grounded in accordance with NFPA 70. Metallic parts located in resin application areas, including but not limited to exhaust ducts, ventilation fans, spray application equipment, workpieces and piping, shall be electrically grounded.~~

Reason: The current section includes some, but not all of the safety requirements for protection of operations. This edit removed items that are duplicated in NFPA 33 and directs the user to the complete set of safety requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 592

Comment 2:

IFC: 2405.1

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2405.1 General. Dip-tank operations shall comply with the requirements of Section 2403 and Sections 2405.2 through 2405.11 and the applicable provisions of NFPA 34.

Reason: This change is part of a targeted approach to the changes initially proposed in F184-24. This change pulls in the applicable provisions of NFPA 34 which addresses dipping and coating.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

NFPA 34 is the standard for dipping and coating operations. This change only provides a pointer to the standard.

Comment (CAH2)# 595

Comment 3:

IFC: 2406.1, 2406.2, 2406.3, 2406.4, 2406.4.1, 2406.4.2, 2406.5, 2406.5.1, 2406.6, 2406.6.1, 2406.6.2, 2406.6.3, 2406.6.4, 2406.7

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2406.1 General. Powder coating operations and equipment shall be in accordance with this Section and the applicable provisions of NFPA 33.

2406.2 Location of powder coating operations.. Powder coating operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by fire barrier walls and horizontal assemblies with not less than a 1-hour fire-resistance rating in accordance with the International Building Code. In other occupancies, powder coating operations shall be conducted in enclosed powder coating rooms, enclosed powder coating facilities that are ventilated or ventilated spray booths.

Delete without substitution:

~~**2406.3 Construction of powder coating rooms and booths.** Powder coating rooms shall be constructed of noncombustible materials. Spray booths shall be constructed in accordance with Section 2404.5.3. **Exception:** *Listed* spray booth assemblies that are constructed of other materials shall be allowed.~~

Revise as follows:

2406.3 Fire protection. Areas used for powder coating shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9 and the applicable provisions of NFPA 33.

Delete without substitution:

~~**2406.4.1 Additional protection for fixed systems.** Automated powder application equipment shall be protected by the installation of an *approved*, supervised flame detection apparatus that shall react to the presence of flame within 0.5 second and shall accomplish all of~~

~~the following:~~

1. ~~Shutting down of energy supplies (electrical and compressed air) to conveyor, ventilation, application, transfer and powder collection equipment.~~
2. ~~Closing of segregation dampers in associated ductwork to interrupt airflow from application equipment to powder collectors.~~
3. ~~Activation of an alarm that is audible throughout the powder coating room or booth.~~

Revise as follows:

2406.3.1 Fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided for areas used for powder coating in accordance with the requirements for an extra-hazard occupancy.

2406.4 Operation and maintenance. Powder coating areas shall be kept free from the accumulation of powder coating dusts, including horizontal surfaces such as ledges, beams, pipes, hoods, booths and floors.

2406.4.1 Cleaning. Surfaces shall be cleaned in such a manner so as to avoid scattering dusts to other places or creating dust clouds. Vacuum sweeping equipment shall be of a type *approved* for use in hazardous locations.

2406.5 Sources of ignition. Control of sources of ignition shall be in accordance with the applicable provisions of NFPA 70.

Delete without substitution:

~~**2406.6.1 Drying, curing and fusion equipment.** Drying, curing and fusion equipment shall comply with Chapter 30.~~

~~**2406.6.2 Spark-producing metals.** Iron or spark-producing metals shall be prevented from being introduced into the powders being applied by magnetic separators, filter-type separators or by other *approved* means.~~

~~**2406.6.3 Preheated parts.** When parts are heated prior to coating, the temperature of the parts shall not exceed the ignition temperature of the powder to be used.~~

~~**2406.6.4 Grounding and bonding.** Precautions shall be taken to minimize the possibility of ignition by static electrical sparks through static bonding and grounding, where possible, of powder transport, application and recovery equipment.~~

2406.7 Ventilation. Exhaust ventilation shall be sufficient to maintain the atmosphere below one-half the minimum explosive concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.

Reason: The current section includes some, but not all of the safety requirements for powder coating. This edit removed items that are duplicated in NFPA 33 and directs the user to the complete set of safety requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 597

Comment 4:

IFC: 2404.1

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.1 General. The application of *flammable* or *combustible liquids* by means of spray apparatus in continuous or intermittent processes shall be in accordance with ~~the requirements of~~ this Section, Section~~s~~ 2403 and the applicable provisions of NFPA 33 ~~2404.4 through 2404.11.4~~.

Reason: The current section includes some, but not all of the safety requirements for spray finishing. This edit, in addition to pointing to the appropriate sections in this code, also directs the user to the complete set of safety requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that change more clearly directs the user to NFPA 33 for additional requirements that fully addresses the hazards.

Comment (CAH2)# 599

Comment 5:

IFC: 2404.5.3, 2404.5.3.1, 2404.5.3.2, 2404.5.3.3, 2404.5.3.4, 2404.5.3.5, 2404.5.3.6

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.5.3 Spray booths. The design and construction of spray booths shall be in accordance with Sections 2404.5.3.1 through 2404.5.3.3~~6~~, Sections 2404.6 through 2404.10 and NFPA 33.

Delete without substitution:

~~**2404.5.3.1 Construction.** Spray booths shall be constructed of *approved* noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.~~

~~**2404.5.3.2 Surfaces.** The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.~~

~~**2404.5.3.3 Floor.** Combustible floor construction in spray booths shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.~~

Revise as follows:

2404.5.3.1 ~~2404.5.3.4~~ Means of egress. *Means of egress* shall be provided in accordance with Chapter 10.

Exception: *Means of egress* doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

2404.5.3.2 ~~2404.5.3.5~~ Clear space. Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a *fire-resistance rating* of not less than 1 hour, provided that the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an *exterior wall* or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

2404.5.3.3 ~~2404.5.3.6~~ Size. The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *International Building Code*.**Exception:** One individual booth not exceeding 500 square feet (46 m^2).

Reason: The current section includes some, but not all of the safety requirements for spray finishing. This edit removed items that are duplicated in NFPA 33 and directs the user to the complete set of safety requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 601

Comment 6:

IFC: 2404.6

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.6 Fire protection. Spray booths and spray rooms shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9 and NFPA 33. Protection shall extend to exhaust plenums, exhaust ducts and both sides of dry filters where such filters are used.

Reason: The current section includes some, but not all of the fire protection requirements for spray finishing. This edit directs the users to the complete set of fire protection requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 602

Comment 7:

IFC: 2404.8.1, 2404.8.1.1, 2404.8.1.2, 2404.8.1.2.1, 2404.8.1.2.2

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.8.1 Drying operations. Spray booths and spray rooms ~~shall not be alternately~~ used for the purpose of drying by arrangements or methods that could cause an increase in the surface temperature of the spray booth or spray room shall comply with the applicable provisions of Chapter 30 and NFPA 33.~~except in accordance with Sections 2404.8.1.1 and 2404.8.1.2. Except as specifically provided in this section, drying or baking units utilizing a heating system having open flames or that are capable of producing sparks shall not be installed in a flammable vapor areas~~.

Delete without substitution:

~~**2404.8.1.1 Spraying procedure.** The spraying procedure shall use low-volume spray application.~~

~~**2404.8.1.2 Drying apparatus.** Fixed drying apparatus shall comply with this chapter and the applicable provisions of Chapter 30. Where recirculation ventilation is provided in accordance with Section 2404.9.2, the heating system shall not be within the recirculation air path.~~

~~**2404.8.1.2.1 Interlocks.** The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:~~

1. ~~Prevent operation of the spraying apparatus while drying operations are in progress.~~
2. ~~Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based on completing not fewer than four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.~~

3. Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
4. Shut off the drying apparatus automatically if the discharge temperature of the air heater exceeds the maximum discharge air temperature allowed in accordance with the heater's listing or 221°F (105°C).

2404.8.1.2.2 Portable infrared apparatus. Where a portable infrared drying apparatus is used, electrical wiring and portable infrared drying equipment shall comply with NFPA 70. Electrical equipment located within 18 inches (457 mm) of floor level shall be *approved* for Class I, Division 2, hazardous locations. Metallic parts of drying apparatus shall be electrically bonded and grounded. During spraying operations, portable drying apparatus and electrical connections and wiring thereto shall not be located within spray booths, spray rooms or other areas where spray residue would be deposited thereon.

Reason: The current section includes some, but not all of the safety requirements for drying operations in a spray booth or spray room. This edit removed items that are duplicated in NFPA 33 and directs the user to the complete set of safety requirements in NFPA 33 that would be challenging to repeat within this Chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 603

Comment 8:

IFC: 2404.8.2, 2404.8.2.1, 2404.8.2.2, 2404.8.2.3, 2404.8.2.4

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Delete without substitution:

2404.8.2 Illumination. Where spraying spaces, spray rooms or spray booths are illuminated through glass panels or other transparent materials, only fixed luminaires shall be utilized as a source of illumination.

2404.8.2.1 Glass panels. Panels for luminaires or for observation shall be of heat treated glass, wired glass or hammered wire glass and shall be sealed to confine vapors, mists, residues, dusts and deposits to the flammable vapor area. Panels for luminaires shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding 221°F (105°C).

2404.8.2.2 Exterior luminaires. Luminaires attached to the walls or ceilings of a flammable vapor area, but outside of any classified area and separated from the flammable vapor areas by vapor tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.

2404.8.2.3 Integral luminaires. Luminaires that are an integral part of the walls or ceiling of a flammable vapor area are allowed to be separated from the flammable vapor area by glass panels that are an integral part of the luminaire. Such luminaires shall be *listed* for use in Class I, Division 2, or Class II, Division 2, locations, whichever is applicable, and shall be suitable for accumulations of deposits of

~~combustible residues. Such luminaires are allowed to be serviced from inside the flammable vapor area.~~

~~**2404.8.2.4 Portable electric lamps.** Portable electric lamps shall not be used in flammable vapor areas during spraying operations. Portable electric lamps used during cleaning or repairing operations shall be of a type *approved* for hazardous locations.~~

Reason: These requirements, and other equally important requirements, exist in both NFPA 33 and NFPA 70 which are incorporated by reference in this chapter.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 and NFPA 70 that fully addresses the hazards.

Comment (CAH2)# 606

Comment 9:

IFC: 2404.10, 2404.10.1, 2404.10.1.1, 2404.10.1.2, 2404.10.2

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Delete without substitution:

~~**2404.10 Interlocks.** Interlocks for spray application finishes shall be in accordance with Sections 2404.10.1 through 2404.10.2.~~

~~**2404.10.1 Automated spray application operations.** Where protecting automated spray application operations, *automatic fire-extinguishing systems* shall be equipped with an *approved* interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a *fire alarm system*, discharge of the *automatic fire-extinguishing system* shall also activate the building alarm notification appliances.~~

~~**2404.10.1.1 Alarm station.** A manual fire alarm and emergency system shutdown station shall be installed to serve each flammable vapor area. When activated, the station shall accomplish the functions indicated in Section 2404.10.1.~~

~~**2404.10.1.2 Alarm station location.** Not less than one manual fire alarm and emergency system shutdown station shall be provided with *ready access* for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an *exit* from the area.~~

~~**2404.10.2 Ventilation interlock prohibited.** Air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition. **Exception:** Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.~~

Reason: The current section includes some, but not all of the interlock requirements for spray finishing. These requirements exist in NFPA 33 and are already incorporated by reference as the chapter directs users to NFPA 33.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is editorial in that the requirements removed already exist in NFPA 33 that fully addresses the hazards.

Comment (CAH2)# 607

Comment 10:

IFC: 2404.5.3.6

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Delete without substitution:

~~**2404.5.3.6 Size.** The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *International Building Code*.~~

~~**Exception:** One individual booth not exceeding 500 square feet (46 m^2).~~

Reason: This section does not seem to take into account that regardless of the footprint of the spray booth the safety ventilation increases as the amount of spray increases in order to meet the requirements of the flammable concentration in the exhaust. In addition, the amount of paint stored within a spray booth does not increase with size. Therefore, size should not be a factor in determining the hazard level. A spray booth, regardless of size, that meets the requirements of Chapter 24 provides a safe and reliable piece of equipment which should not result in a change in the occupancy classification for the booth or the building. NFPA 33 does not have a size limitation. The proposed change brings this section in alignment with current edition of NFPA 33.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Unknown.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change will allow use of spray booth construction which may be less expensive than fire rated construction.

Comment (CAH2)# 608

Comment 11:

IFC: 2404.9.8

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.9.8 Filters. Air intake filters that are part of a wall or ceiling assembly shall be *listed* ~~as Class I or II~~ in accordance with UL 900. Exhaust filters shall be required.

Reason: UL removed the designations Class I and Class II in November of 2009. The current edition (2015) does not reference Class I and Class II.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change does not affect the cost of the filters.

Comment (CAH2)# 616

Comment 12:

IFC: 2404.5.2

Proponents: Geoffrey Raifsnider, Global Finishing Solutions, Self (graifsnider@globalfinishing.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

Revise as follows:

2404.5.1.1 ~~**2404.5.2**~~ **Floor.** Combustible floor construction in spray rooms shall be covered by *approved*, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

Reason: This section is a requirement for floors of spray rooms and should be a subsection.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a numbering change only.

Comment (CAH2)# 699

F190-24

IFC Chapter 27

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

CHAPTER 27
SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2701
GENERAL

Revise as follows:

2701.1 Scope. Semiconductor fabrication facilities and comparable research and development areas classified as Group H-5 shall comply with ~~this chapter~~NFPA 318 and the *International Building Code*. The use, storage and handling of hazardous materials in Group H-5 shall comply with NFPA 318, this chapter, other applicable provisions of this code and the *International Building Code*.

2701.2 Application. The requirements set forth in this chapter are requirements specific only to Group H-5 and shall be applied as exceptions or additions to applicable requirements set forth elsewhere in this code.

2701.3 Multiple hazards. Where a material poses multiple hazards, all hazards shall be addressed in accordance with Section 5001.1.

2701.4 Existing buildings and existing fabrication areas. Existing buildings and existing *fabrication areas* shall comply with this chapter, except that transportation and handling of HPM in *corridors* and enclosures for *stairways* and *ramps* shall be allowed where in compliance with Section 2705.3.2 and the *International Building Code*.

2701.5 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 2702
DEFINITIONS

2702.1 Definitions. The following terms are defined in Chapter 2:
EMERGENCY CONTROL STATION.

FABRICATION AREA.

GAS DETECTION SYSTEM.

HAZARDOUS PRODUCTION MATERIAL (HPM).

HPM.

HPM ROOM.

PASS-THROUGH.

SEMICONDUCTOR FABRICATION FACILITY.

SERVICE CORRIDOR.

TOOL.

WORKSTATION.

SECTION 2703
GENERAL SAFETY PROVISIONS

Revise as follows:

2703.1 Emergency control station. An *emergency control station* shall be provided in accordance with Sections 2703.1.1 through 2703.1.2.

2703.1.1 Location. ~~The *emergency control station* shall be located on the premises at an *approved* location outside the fabrication area.~~

2703.1.~~2~~1 Staffing. Trained personnel shall continuously staff the *emergency control station*.

2703.1.~~3~~2 Signals. The *emergency control station* shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:

1. *Automatic sprinkler system* alarm and monitoring systems.
2. Manual fire alarm systems.
3. *Emergency alarm systems*.
4. *Gas detection systems*.
5. Smoke detection systems.
6. Emergency power systems.
7. Automatic detection and alarm systems for *pyrophoric* liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
8. Exhaust ventilation flow alarm devices for *pyrophoric* liquids and Class 3 water-reactive liquids and cabinet exhaust ventilation systems required by Section 2705.2.3.4.

2703.2 Systems, equipment and processes. Systems, equipment and processes shall be in accordance with Sections 2703.2.1 through 2703.2.3.2.

2703.2.1 Application. Systems, equipment and processes shall include, but not be limited to, containers, cylinders, tanks, piping, tubing, valves and fittings.

2703.2.2 General requirements. In addition to the requirements in Section 2703.2, systems, equipment and processes shall comply with Section 5003.2, other applicable provisions of this code, the *International Building Code* and the *International Mechanical Code*.

2703.2.3 Additional requirements for HPM supply piping. In addition to the requirements in Section 2703.2, HPM supply piping and tubing for HPM gases and liquids shall comply with this section.

2703.2.3.1 General requirements. The requirements set forth in Section 5003.2.2.2 shall apply to supply piping and tubing for HPM gases and liquids.

2703.2.3.2 Health-hazard ranking 3 or 4 HPM. Supply piping and tubing for HPM gases and liquids having a health-hazard ranking of 3 or 4 shall be welded throughout, except for connections located within a ventilation enclosure if the material is a gas, or an *approved*

method of drainage or containment provided for connections if the material is a liquid.

2703.3 Construction requirements. Construction of semiconductor fabrication facilities shall be in accordance with Sections 2703.3.1 through 2703.3.9.

2703.3.1 Fabrication areas. Construction and location of *fabrication areas* shall comply with the *International Building Code*.

2703.3.2 Pass-throughs in exit access corridors. Pass-throughs in *exit access corridors* shall be constructed in accordance with the *International Building Code*.

2703.3.3 Liquid storage rooms. Liquid storage rooms shall comply with Chapter 57 and the *International Building Code*.

2703.3.4 HPM rooms. HPM rooms shall comply with the *International Building Code*.

2703.3.5 Gas cabinets. Gas cabinets shall comply with Section 5003.8.6.

2703.3.6 Exhausted enclosures. Exhausted enclosures shall comply with Section 5003.8.5.

2703.3.7 Gas rooms. Gas rooms shall comply with Section 5003.8.4.

2703.3.8 Service corridors. Service corridors shall comply with Section 2705.3 and the *International Building Code*.

2703.3.9 Cabinets containing pyrophoric liquids or water-reactive Class 3 liquids. Cabinets in *fabrication areas* containing *pyrophoric* liquids or Class 3 water-reactive liquids in containers or in amounts greater than $^{1}/_{2}$ gallon (2 L) shall comply with Section 2705.2.3.4.

2703.4 Emergency plan. An emergency plan shall be established as set forth in Section 403.6.1.

2703.5 Maintenance of equipment, machinery and processes. Maintenance of equipment, machinery and processes shall comply with Section 5003.2.6.

2703.6 Security of areas. Areas shall be secured in accordance with Section 5003.9.2.

Delete without substitution:

~~**2703.7 Electrical wiring and equipment.** Electrical wiring and equipment in HPM facilities shall comply with Sections 2703.7.1 through 2703.7.3.~~

~~**2703.7.1 Fabrication areas.** Electrical wiring and equipment in *fabrication areas* shall comply with NFPA 70.~~

~~**2703.7.2 Workstations.** Electrical equipment and devices within 5 feet (1524 mm) of workstations in which flammable or *pyrophoric* gases or *flammable liquids* are used shall comply with NFPA 70 for Class I, Division 2 hazardous locations. Workstations shall not be energized without adequate exhaust ventilation in accordance with Section 2703.14. **Exception:** Class I, Division 2 hazardous electrical equipment is not required where the air removal from the workstation or dilution will prevent the accumulation of flammable vapors and fumes on a continuous basis.~~

~~**2703.7.3 Hazardous production material (HPM) rooms, gas rooms and liquid storage rooms.** Electrical wiring and equipment in HPM rooms, gas rooms and liquid storage rooms shall comply with NFPA 70.~~

2703.8 Corridors and enclosures for stairways and ramps. Hazardous materials shall not be used or stored in *corridors* or enclosures for *stairways* and *ramps*.

2703.9 Service corridors. Hazardous materials shall not be used in an *open-system* use condition in service corridors.

Delete without substitution:

2703.10 Automatic sprinkler system. An *approved automatic sprinkler system* shall be provided in accordance with Sections 2703.10.1 through 2703.10.5 and Chapter 9.

2703.10.1 Workstations and tools. The design of the sprinkler system in the area shall take into consideration the spray pattern and the effect on the equipment.

2703.10.1.1 Combustible workstations. A sprinkler head shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head in the exhaust connection or plenum shall be located not more than 2 feet (610 mm) from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head and connecting piping in the duct shall be coated with *approved* or *listed* corrosion-resistant materials. Access to the sprinkler head shall be provided for periodic inspection. **Exceptions:**

1. *Approved* alternative *automatic fire-extinguishing systems* are allowed. Activation of such systems shall deactivate the related processing equipment.
2. Process equipment that operates at temperatures exceeding 932°F (500°C) and is provided with automatic shutdown capabilities for hazardous materials.
3. Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.
4. Ducts *listed* or *approved* for use without internal automatic sprinkler protection.

2703.10.1.2 Combustible tools. Where the horizontal surface of a combustible tool is obstructed from ceiling sprinkler discharge, automatic sprinkler protection that covers the horizontal surface of the tool shall be provided. **Exceptions:**

1. An automatic gaseous fire-extinguishing local surface application system shall be allowed as an alternative to sprinklers. Gaseous extinguishing systems shall be actuated by infrared (IR) or ultraviolet/infrared (UV/IR) optical detectors.
2. Tools constructed of materials that are *listed* as Class 1 or Class 2 in accordance with UL 2360 or *approved* for use without internal fire-extinguishing system protection.

2703.10.2 Gas cabinets and exhausted enclosures. An *approved automatic sprinkler system* shall be provided in gas cabinets and exhausted enclosures containing HPM *compressed gases*. **Exception:** Gas cabinets located in an HPM room other than those cabinets containing *pyrophoric* gases.

2703.10.3 Pass-throughs in existing exit access corridors. Pass-throughs in existing *exit access corridors* shall be protected by an *approved automatic sprinkler system*.

2703.10.4 Exhaust ducts for HPM. An *approved automatic sprinkler system* shall be provided in exhaust ducts conveying gases, vapors, fumes, mists or dusts generated from HPM in accordance with this section and the *International Mechanical Code*.

2703.10.4.1 Metallic and noncombustible nonmetallic exhaust ducts. An *approved automatic sprinkler system* shall be provided in metallic and noncombustible nonmetallic exhaust ducts where all of the following conditions apply:

1. Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).
2. The ducts are within the building.
3. The ducts are conveying flammable gases, vapors or fumes.

~~**2703.10.4.2 Combustible nonmetallic exhaust ducts.** An *approved automatic sprinkler system* shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).~~

~~**Exceptions:**~~

1. ~~Ducts *listed* or *approved* for applications without *automatic sprinkler system* protection.~~
2. ~~Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.~~

~~**2703.10.4.3 Exhaust connections and plenums of combustible workstations.** *Automatic fire-extinguishing system* protection for exhaust connections and plenums of combustible workstations shall comply with Section 2703.10.1.1.~~

~~**2703.10.4.4 Exhaust duct sprinkler system requirements.** Automatic sprinklers installed in exhaust duct systems shall be hydraulically designed to provide 0.5 gallon per minute (gpm) (1.9 L/min) over an area derived by multiplying the distance between the sprinklers in a horizontal duct by the width of the duct. Minimum discharge shall be 20 gpm (76 L/min) per sprinkler from the five hydraulically most remote sprinklers.~~

~~**2703.10.4.4.1 Sprinkler locations.** Automatic sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, automatic sprinklers shall be installed at the top and at alternate floor levels.~~

~~**2703.10.4.4.2 Control valve.** A separate indicating control valve shall be provided for sprinklers installed in exhaust ducts.~~

~~**2703.10.4.4.3 Drainage.** Drainage shall be provided to remove sprinkler water discharged in exhaust ducts.~~

~~**2703.10.4.4.4 Corrosive atmospheres.** Where corrosive atmospheres exist, exhaust duct sprinklers and pipe fittings shall be manufactured of corrosion-resistant materials or coated with *approved* materials.~~

~~**2703.10.4.4.5 Maintenance and inspection.** Access to sprinklers in exhaust ducts shall be provided for periodic inspection and maintenance.~~

~~**2703.10.5 Sprinkler alarms and supervision.** *Automatic sprinkler systems* shall be electrically supervised and provided with alarms in accordance with Chapter 9. *Automatic sprinkler system* alarm and supervisory signals shall be transmitted to the *emergency control station.*~~

~~**2703.11 Manual fire alarm system.** A manual *fire alarm system* shall be installed throughout buildings containing a Group H-5 occupancy. Activation of the alarm system shall initiate a local alarm and transmit a signal to the *emergency control station.* Manual fire alarm systems shall be designed and installed in accordance with Section 907.~~

2703.12 Emergency alarm system. *Emergency alarm systems* shall be provided in accordance with Sections 2703.12.1 through 2703.12.3, Section 5004.9 and Section 5005.4.4. The *maximum allowable quantity per control area* provisions of Section 5004.1 shall not apply to *emergency alarm systems* required for HPM.

2703.12.1 Where required. *Emergency alarm systems* shall be provided in the areas indicated in Sections 2703.12.1.1 through 2703.12.1.3.

2703.12.1.1 Service corridors. An *approved emergency alarm system* shall be provided in service corridors, with not less than one alarm device in the service corridor.

2703.12.1.2 Corridors and interior exit stairways and ramps. Emergency alarms for *corridors*, *interior exit stairways* and *ramps* and *exit passageways* shall comply with Section 5005.4.4.

2703.12.1.3 Liquid storage rooms, HPM rooms and gas rooms. Emergency alarms for liquid storage rooms, HPM rooms and gas

rooms shall comply with Section 5004.9.

2703.12.2 Alarm-initiating devices. An *approved* emergency telephone system, local alarm manual pull stations, or other *approved* alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.

2703.12.3 Alarm signals. Activation of the *emergency alarm system* shall sound a local alarm and transmit a signal to the *emergency control station*.

2703.13 Gas detection systems. A *gas detection system* complying with Section 916 shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 2703.13.1 through 2703.13.2.2.

2703.13.1 Where required. A *gas detection system* shall be provided in the areas identified in Sections 2703.13.1.1 through 2703.13.1.4.

2703.13.1.1 Fabrication areas. A *gas detection system* shall be provided in *fabrication areas* where HPM gas is used in the *fabrication area*.

2703.13.1.2 HPM rooms. A *gas detection system* shall be provided in HPM rooms where HPM gas is used in the room.

2703.13.1.3 Gas cabinets, exhausted enclosures and gas rooms. A *gas detection system* shall be provided in gas cabinets and exhausted enclosures for HPM gas. A *gas detection system* shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

2703.13.1.4 Corridors. Where HPM gases are transported in piping placed within the space defined by the walls of a *corridor* and the floor or roof above the *corridor*, a *gas detection system* shall be provided where piping is located and in the *corridor*.

Exception: A *gas detection system* is not required for occasional transverse crossings of the *corridors* by supply piping that is enclosed in a ferrous pipe or tube for the width of the *corridor*.

2703.13.2 Gas detection system operation. The *gas detection system* shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60.

2703.13.2.1 Alarms. The *gas detection system* shall initiate a local alarm and transmit a signal to the *emergency control station* when a short-term hazard condition is detected. The alarm shall be both visible and audible and shall provide warning both inside and outside the area where the gas is detected. The audible alarm shall be distinct from all other alarms.

2703.13.2.2 Shut off of gas supply. The *gas detection system* shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected. Automatic closure of shutoff valves shall comply with the following:

1. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.

2. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a room and *compressed gas* containers are not in gas cabinets or exhausted enclosure, the shutoff valves on all gas lines for the specific gas detected shall automatically close.
3. Where the gas-detection sampling point initiating the *gas detection system* alarm is within a piping distribution manifold enclosure, the shutoff valve supplying the manifold for the *compressed gas* container of the specific gas detected shall automatically close.

Exception: Where the gas-detection sampling point initiating the *gas detection system* alarm is at the use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve for the branch line located in the piping distribution manifold enclosure shall automatically close.

2703.14 Exhaust ventilation systems for HPM. Exhaust ventilation systems and materials for exhaust ducts utilized for the exhaust of HPM shall comply with Sections 2703.14.1 through 2703.14.3, other applicable provisions of this code, the *International Building Code* and the *International Mechanical Code*.

2703.14.1 Where required. Exhaust ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the *International Building Code*:

1. *Fabrication areas*: Exhaust ventilation for *fabrication areas* shall comply with the *International Building Code*. The *fire code official* is authorized to require additional manual control switches.
2. Workstations: A ventilation system shall be provided to capture and exhaust gases, fumes and vapors at workstations.
3. Liquid storage rooms: Exhaust ventilation for liquid storage rooms shall comply with Section 5004.3.1 and the *International Building Code*.
4. HPM rooms: Exhaust ventilation for HPM rooms shall comply with Section 5004.3.1 and the *International Building Code*.
5. Gas cabinets: Exhaust ventilation for gas cabinets shall comply with Section 5003.8.6.2. The gas cabinet ventilation system is allowed to connect to a workstation ventilation system. Exhaust ventilation for gas cabinets containing highly toxic or toxic gases shall also comply with Chapter 60.
6. Exhausted enclosures: Exhaust ventilation for exhausted enclosures shall comply with Section 5003.8.5.2. Exhaust ventilation for exhausted enclosures containing highly toxic or toxic gases shall also comply with Chapter 60.
7. Gas rooms: Exhaust ventilation for gas rooms shall comply with Section 5003.8.4.2. Exhaust ventilation for gas rooms containing highly toxic or toxic gases shall also comply with Chapter 60.
8. Cabinets containing *pyrophoric* liquids or Class 3 water-reactive liquids: Exhaust ventilation for cabinets in *fabrication areas* containing *pyrophoric* liquids or Class 3 water-reactive liquids shall be as required in Section 2705.2.3.4.

2703.14.2 Penetrations. Exhaust ducts penetrating *fire barriers* constructed in accordance with Section 707 of the International Building Code or *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code shall be contained in a shaft of equivalent *fire-resistance-rated* construction. Exhaust ducts shall not penetrate *fire walls*. *Fire dampers* shall not be installed in exhaust ducts.

2703.14.3 Treatment systems. Treatment systems for highly toxic and toxic gases shall comply with Chapter 60.

Delete without substitution:

~~**2703.15 Emergency power system.** An emergency power system shall be provided in Group H-5 occupancies in accordance with Section 1203. The emergency power system shall supply power automatically to the electrical systems specified in Section 2703.15.1 when the normal supply system is interrupted.~~

~~**2703.15.1 Required electrical systems.** Emergency power shall be provided for electrically operated equipment and connected control circuits for the following systems:~~

1. HPM exhaust ventilation systems.
2. HPM gas cabinet ventilation systems.
3. HPM exhausted enclosure ventilation systems.
4. HPM gas room ventilation systems.
5. HPM *gas detection systems*.
6. *Emergency alarm systems*.
7. Manual fire alarm systems.
8. *Automatic sprinkler system* monitoring and alarm systems.
9. Automatic alarm and detection systems for *pyrophoric* liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4.
10. Flow alarm switches for *pyrophoric* liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required in Section 2705.2.3.4.
11. Electrically operated systems required elsewhere in this code or in the *International Building Code* applicable to the use, storage or handling of HPM.

2703.15.2 Exhaust ventilation systems. Exhaust ventilation systems are allowed to be designed to operate at not less than one-half the normal fan speed on the emergency power system where it is demonstrated that the level of exhaust will maintain a safe atmosphere.

2703.16 Sub-atmospheric pressure gas systems. Sub-atmospheric pressure gas systems (SAGS) shall be in accordance with NFPA 318.

SECTION 2704
STORAGE

2704.1 General. Storage of hazardous materials shall comply with Section 2703 and this section and other applicable provisions of this code.

2704.2 Fabrication areas. Hazardous materials storage and the maximum quantities of hazardous materials in use and storage allowed in *fabrication areas* shall be in accordance with Sections 2704.2.1 through 2704.2.2.1.

2704.2.1 Location of HPM storage in fabrication areas. Storage of HPM in *fabrication areas* shall be within *approved* or *listed* storage cabinets, gas cabinets, exhausted enclosures or within a workstation as follows:

1. *Flammable* and *combustible liquid* storage cabinets shall comply with Section 5704.3.2.
2. Hazardous materials storage cabinets shall comply with Section 5003.8.7.
3. Gas cabinets shall comply with Section 5003.8.6. Gas cabinets for highly toxic or toxic gases shall also comply with Section 6004.1.2.
4. Exhausted enclosures shall comply with Section 5003.8.5. Exhausted enclosures for highly toxic or toxic gases shall also comply with Section 6004.1.3.
5. Workstations shall comply with Section 2705.2.3.

2704.2.2 Maximum aggregate quantities in fabrication areas. The aggregate quantities of hazardous materials stored or used in a single *fabrication area* shall be limited as specified in this section. **Exception:** *Fabrication areas* containing quantities of hazardous materials not exceeding the maximum allowable quantities per control area established by Sections 5003.1.1, 5704.3.4 and 5704.3.5.

Revise as follows:

2704.2.2.1 Storage and use in fabrication areas. The maximum quantities of hazardous materials stored or used in a single *fabrication area* shall not exceed the quantities set forth in NFPA 318.~~Table 2704.2.2.1.~~

Delete without substitution:

~~TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]~~

~~HAZARD CATEGORY~~	~~SOLIDS (pounds per square foot)~~	~~LIQUIDS (gallons per square foot)~~	~~GAS (cubic feet @ NTP per square foot)~~
~~Physical Hazard Materials~~			
~~Combustible dust~~	~~Note b~~	~~Not Applicable~~	~~Not Applicable~~
~~Combustible fiber~~		~~Not Applicable~~	~~Not Applicable~~
~~Loose~~	~~Note b~~		
~~Baled~~	~~Notes b and c~~		
~~Combustible liquid~~	~~Not Applicable~~		~~Not Applicable~~
~~Class II~~		~~0.02~~	
~~Class IIIA~~		~~0.04~~	
~~Class IIIB~~		~~Not Limited~~	
~~Combination Class I, II and IIIA~~		~~0.08~~	
~~Cryogenic gas~~	~~Not Applicable~~	~~Not Applicable~~	
~~Flammable~~			~~Note d~~
~~Oxidizing~~			~~2.5~~
~~Explosives~~	~~Note b~~	~~Note b~~	~~Note b~~
~~Flammable gas~~	~~Not Applicable~~	~~Not Applicable~~	
~~Gaseous~~			~~Note d~~
~~Liquefied~~			~~Note d~~
~~Flammable liquid~~	~~Not Applicable~~		~~Not Applicable~~
~~Class IA~~		~~0.005~~	
~~Class IB~~		~~0.05~~	
~~Class IC~~		~~0.05~~	
~~Combination Class IA, IB and IC~~		~~0.05~~	
~~Combination Class I, II and IIIA~~		~~0.08~~	
~~Flammable solid~~	~~0.002~~	~~Not Applicable~~	~~Not Applicable~~
~~Organic peroxide~~			~~Not Applicable~~
~~Unclassified detonable~~	~~Note b~~	~~Note b~~	
~~Class I~~	~~Note b~~	~~Note b~~	
~~Class II~~	~~0.05~~	~~0.0025~~	
~~Class III~~	~~0.2~~	~~0.02~~	
~~Class IV~~	~~Not Limited~~	~~Not Limited~~	
~~Class V~~	~~Not Limited~~	~~Not Limited~~	
~~Oxidizing gas~~	~~Not Applicable~~	~~Not Applicable~~	
~~Gaseous~~			~~2.5~~
~~Liquefied~~			~~2.5~~
~~Combination of gaseous and liquefied~~			~~2.5~~
~~Oxidizer~~			~~Not Applicable~~
~~Class 4~~	~~Note b~~	~~Note b~~	
~~Class 3~~	~~0.006~~	~~0.06~~	
~~Class 2~~	~~0.006~~	~~0.06~~	
~~Class 1~~	~~0.006~~	~~0.06~~	
~~Combination Class 1, 2, 3~~	~~0.006~~	~~0.06~~	
~~Pyrophoric materials~~	~~Note b~~	~~0.0025~~	~~Notes d and e~~
~~Unstable (reactive)~~			
~~Class 4~~	~~Note b~~	~~Note b~~	~~Note b~~
~~Class 3~~	~~0.05~~	~~0.005~~	~~Note b~~
~~Class 2~~	~~0.2~~	~~0.02~~	~~Note b~~
~~Class 1~~	~~Not Limited~~	~~Not Limited~~	~~Not Limited~~
~~Water reactive~~			~~Not Applicable~~
~~Class 3~~	~~0.02[f]~~	~~0.0025~~	
~~Class 2~~	~~0.5~~	~~0.05~~	
~~Class 1~~	~~Not Limited~~	~~Not Limited~~	
~~Health Hazard Materials~~			
~~Corrosives~~	~~Not Limited~~	~~Not Limited~~	~~Not Limited~~
~~Highly toxic~~	~~Not Limited~~	~~Not Limited~~	~~Note d~~
~~Toxics~~	~~Not Limited~~	~~Not Limited~~	~~Note d~~

~~For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.~~

~~a. Hazardous materials within piping shall not be included in the calculated quantities.~~

~~b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).~~

~~c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.~~

~~d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.~~

~~e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.~~

~~f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.~~

2704.3 Indoor storage outside of fabrication areas. The indoor storage of hazardous materials outside of *fabrication areas* shall be in accordance with Sections 2704.3.1 through 2704.3.3.

2704.3.1 HPM storage. The indoor storage of HPM in quantities greater than those listed in Sections 5003.1.1 and 5704.3.4 shall be in a room complying with the requirements of the *International Building Code* and this code for a liquid storage room, HPM room or gas room as appropriate for the materials stored.

2704.3.2 Other hazardous materials storage. The indoor storage of other hazardous materials shall comply with Sections 5001, 5003 and 5004 and other applicable provisions of this code.

2704.3.3 Separation of incompatible hazardous materials. Incompatible hazardous materials in storage shall be separated from each other in accordance with Section 5003.9.8.

SECTION 2705
USE AND HANDLING

2705.1 General. The use and handling of hazardous materials shall comply with this section, Section 2703 and other applicable provisions of this code.

2705.2 Fabrication areas. The use of hazardous materials in *fabrication areas* shall be in accordance with Sections 2705.2.1 through 2705.2.3.4.

2705.2.1 Location of HPM in use in fabrication areas. Hazardous production materials in use in *fabrication areas* shall be within *approved* or *listed* gas cabinets, exhausted enclosures or a workstation.

Revise as follows:

2705.2.2 Maximum aggregate quantities in fabrication areas. The aggregate quantities of hazardous materials in a single *fabrication area* and the quantity of HPM in use at a workstation shall comply with NFPA 318. ~~Section 2704.2.2 and Table 2704.2.2.1. The quantity of HPM in use at a workstation shall not exceed the quantities listed in Table 2705.2.2.~~

Delete without substitution:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, c]
	Solid	20 pounds[a, b]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[e, f]
	Solid	4.4 pounds[e, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[e, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note c applies, the maximum increase allowed for both Notes b and c shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

2705.2.3 Workstations. Workstations in *fabrication areas* shall be in accordance with Sections 2705.2.3.1 through 2705.2.3.4.

2705.2.3.1 Construction. Workstations in *fabrication areas* shall be constructed of materials compatible with the materials used and stored at the workstation. The portion of the workstation that serves as a cabinet for HPM gases, Class I *flammable liquids* or Class II or Class IIIA *combustible liquids* shall be noncombustible and, if of metal, shall be not less than 0.0478-inch (18 gage) (1.2 mm) steel.

2705.2.3.2 Protection of vessels. Vessels containing hazardous materials located in or connected to a workstation shall be protected as follows:

1. HPM: Vessels containing HPM shall be protected from physical damage and shall not project from the workstation.

2. Hazardous *cryogenic fluids*, gases and liquids: Hazardous *cryogenic fluid*, gas and liquid vessels located within a workstation shall be protected from seismic forces in an *approved* manner in accordance with the *International Building Code*.
3. *Compressed gases*: Protection for *compressed gas* vessels shall also comply with Section 5303.5.
4. *Cryogenic fluids*: Protection for *cryogenic fluid* vessels shall also comply with Section 5503.5.

2705.2.3.3 Drainage and containment for HPM liquids. Each workstation utilizing HPM liquids shall have all of the following:

1. Drainage piping systems connected to a compatible system for disposition of such liquids.
2. The work surface provided with a slope or other means for directing spilled materials to the containment or drainage system.
3. An *approved* means of containing or directing spilled or leaked liquids to the drainage system.

2705.2.3.4 Pyrophoric solids, liquids and Class 3 water-reactive liquids. *Pyrophoric* liquids and Class 3 water-reactive liquids in containers greater than 0.5-gallon (2 L) but not exceeding 5.3-gallon (20 L) capacity and *pyrophoric* solids in containers greater than 4.4 pounds (2 kg) but not exceeding 44 pounds (20 kg) shall be allowed at workstations where located inside cabinets and the following conditions are met:

1. Maximum amount per cabinet: The maximum amount per cabinet shall be limited to 5.3 gallons (20 L) of liquids and 44 pounds (20 kg) of total liquids and solids.
2. Cabinet construction: Cabinets shall be constructed in accordance with the following:
   2.1. Cabinets shall be constructed of not less than 0.097-inch (2.5 mm) (12 gage) steel.
   2.2. Cabinets shall be permitted to have self-closing limited access ports or noncombustible windows that provide access to equipment controls.
   2.3. Cabinets shall be provided with self- or manual-closing doors. Manual-closing doors shall be equipped with a door switch that will initiate local audible and visual alarms when the door is in the open position.
3. Cabinet exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
   3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
   3.2. The system shall be equipped with monitoring equipment to ensure that required exhaust flow or static pressure is provided.
   3.3. Low-flow or static pressure conditions shall send an alarm to the on-site *emergency control station*. The alarm shall be both visual and audible.
4. Cabinet spill containment: Spill containment shall be provided in each cabinet, with the spill containment capable of holding the contents of the aggregate amount of liquids in containers in each cabinet.
5. Valves: Valves in supply piping between the product containers in the cabinet and the workstation served by the containers shall fail in the closed position upon power failure, loss of exhaust ventilation and upon actuation of the fire control system.

6. Fire detection system: Each cabinet shall be equipped with an automatic fire detection system complying with the following conditions:
    6.1. Automatic detection system: UV/IR, high-sensitivity smoke detection (HSSD) or other *approved* detection systems shall be provided inside each cabinet.
    6.2. Automatic shutoff: Activation of the detection system shall automatically close the shutoff valves at the source on the liquid supply.
    6.3. Alarms and signals: Activation of the detection system shall initiate a local alarm within the *fabrication area* and transmit a signal to the *emergency control station*. The alarms and signals shall be both visual and audible.

2705.3 Transportation and handling. The transportation and handling of hazardous materials shall comply with Sections 2705.3.1 through 2705.3.4.1 and other applicable provisions of this code.

2705.3.1 Corridors and enclosures for stairways and ramps. *Corridors* and enclosures for *exit stairways* and *ramps* in new buildings or serving new *fabrication areas* shall not contain HPM, except as permitted in *corridors* by Section 415.11.7.4 of the International Building Code and Section 2705.3.2 of this code.

2705.3.2 Transport in corridors and enclosures for stairways and ramps. Transport in *corridors* and enclosures for *stairways* and *ramps* shall be in accordance with Sections 2705.3.2.1 through 2705.3.3.

2705.3.2.1 Fabrication area alterations. Where existing *fabrication areas* are altered or modified in existing buildings, HPM is allowed to be transported in existing *corridors* where such *corridors* comply with Section 5003.10 of this code and Section 415.11.2 of the International Building Code.

2705.3.2.2 HPM transport in corridors and enclosures for stairways and ramps. Nonproduction HPM is allowed to be transported in *corridors* and enclosures for *stairways* and *ramps* where utilized for maintenance, lab work and testing when the transportation is in accordance with Section 5003.10.

2705.3.3 Service corridors. Where a new *fabrication area* is constructed, a service corridor shall be provided where it is necessary to transport HPM from a liquid storage room, HPM room, gas room or from the outside of a building to the perimeter wall of a *fabrication area*. Service corridors shall be designed and constructed in accordance with the *International Building Code*.

2705.3.4 Carts and trucks. Carts and trucks used to transport HPM in *corridors* and enclosures for *stairways* and *ramps* shall comply with Section 5003.10.3.

2705.3.4.1 Identification. Carts and trucks shall be marked to indicate the contents.

Reason: The overall intent of this proposal is to be more reliant on the nationally recognized standard, NFPA 318. For the most part, provisions in this chapter that are design and construction related are proposed for deletion unless the provisions refer to additional requirements in another I-code or another section of the IFC, that may not be in NFPA 318. With the exception of the MAQ tables, storage, use, and handling requirements have been retained for several reasons, one of which is that the requirements of NFPA 318 do not apply to existing facilities. The MAQ tables are being proposed for deletion since proposals are submitted almost every cycle to correlate the tables in the IFC with the tables in NFPA 318. Due to the different revision cycles, the tables in a particular edition of the IFC will not necessarily correlate with the tables in the edition of NFPA 318 that is referenced. Lastly, the deletion of text will reduce the likelihood of potential claims regarding copyright infringement issues.

For the most part, the proposal is not intended to be a technical change. The text that is proposed for deletion is covered in NFPA 318 or other sections of the IFC or IBC. For example, sprinkler protection will still be required for semiconductor facilities based upon the requirements of NFPA 318. The installation requirements that currently are contained in the IFC are also contained in either NFPA 318 or NFPA 13, which also references NFPA 318. NFPA 318 requires electrical systems to comply with NFPA 70 in addition to a requirement in the IFC for electrical systems to comply with NFPA 70.

In addition to better correlation with NFPA 318, the proposal should result in a Chapter that is easier to enforce by focusing on use and operational requirements, while relying on the IBC and NFPA 318 for design and construction requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

While not editorial or a clarification, the proposal does result in better correlation between the IFC and NFPA 318. The proposal may decrease the cost of construction in instances where NFPA 318 contains a provision that is not currently specifically permitted by the IFC.

F190-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as it does good job of keeping the certain portion of requirements in Chapter 27 while referencing NFPA 318. There were some reservations that the revisions may need to be reviewed in more detail such as for flammable and combustible liquid storage. (Vote 11-3)

F190-24

Individual Consideration Agenda

Comment 1:

IFC: 2705.2.2, TABLE 2705.2.2 (New)

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

2705.2.2 Maximum aggregate quantities in fabrication areas. The aggregate quantities of hazardous materials in a single *fabrication area and the quantity of HPM in use at a workstation* shall comply with NFPA 318. The quantity of HPM in use at a workstation shall not exceed the quantities listed in Table 2705.2.2.

Add new text as follows:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	20 pounds[a, b]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

Reason: The quantities of HPM at a workstation could vary from the original design and therefore should be retained in the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Retaining the table in the IFC does not impact the cost of construction.

Comment (CAH2)# 664

F193-24

IFC: TABLE 2705.2.2

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	~~20~~ 400 pounds[~~c,~~ b, e]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

Reason: The proposal does two things:

- The MAQ for solid corrosives is increased from 20 to 400 pounds
- For solid corrosives, footnote a is proposed to be deleted but footnote e is proposed to be added

The net effect of the change is to more closely align the MAQs for solid corrosives at a workstation and liquid corrosives at a workstation. If all increases are applied, the current code would restrict the quantity of solid corrosives at a workstation to 80 pounds while the quantity of liquid corrosives at a workstation would be permitted to be 300 gallons (approximately 2500 pounds).

Solid corrosives have a low vapor pressure that required a vacuum to sublime the material in order to produce enough vapor for use in manufacturing. Therefore, the solid corrosive needs to be located close to the point of use. The current MAQ for solid corrosives at a workstation is not realistic for consistent operation of a manufacturing process. Furthermore, the highest risk is associated with changing out a solid corrosive vessel.When comparing the risk of liquid corrosives versus solid corrosives, liquid corrosives generally present a higher risk than solid corrosives for the following reasons:

- Liquids can disseminate across the floor and to lower levels in the event of a leak.
- Solids are of a low vapor pressure resulting in a lower risk of vapor exposure as compared to liquids.
- In the event of a container breach or leak, a liquid can escape to the surrounding area with the potential for a liquid exposure as well as a vapor exposure.
- Vapors are controlled by the exhausted enclosure as well as the area exhaust. Solids are less likely to escape the exhausted enclosure as compared to liquids.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00. The cost of construction and operation should decrease

Estimated Immediate Cost Impact Justification (methodology and variables):

Increasing the MAQ permitted at the workstation reduces the need to change out solid corrosive vessels. This is also not related to construction.

F193-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This was disapproved based upon the action on F190-24 which more broadly references NFPA 318. (Vote 14-0)

F193-24

Individual Consideration Agenda

Comment 1:

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Reason: F193-24 was Disapproved at my request based upon the action on F190-24 which removed the table from the IFC. We have submitted a Public Comment to retain this table in the IFC which makes this proposal relevant. In addition to what was submitted with the original proposal, Micron, a member of SIA, commissioned a study by Jensen Hughes to address this issue. The Conclusion of the report

recommends an increase greater than what is proposed herein (750 pounds). The report also notes:

"Higher workstation limits for solid corrosive materials should not increase the exposure hazard to personnel. In fact, they will result in less frequent material change outs and reduced risks (exposure) associated with material handling, which is consistent with the intent of the code."

Bibliography: Kyle Lazzaro and Michelle Peatross, "*Final Report: Solid Corrosive Materials For HPM Workstation Use, Hazardous Materials Assessment* ", Jensen Hughes, January 28, 2024

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 671

F194-24

IFC: TABLE 2705.2.2

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Fire Code

Revise as follows:

TABLE 2705.2.2 MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	20 pounds[a, b]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizing	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Oxidizer Class 3 and Class 4 (aggregate)	~~Gas~~	~~Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet~~
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Oxidizer Class 4	Liquid	Maximum Allowable Quantity
	Solid	Maximum Allowable Quantity
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Unstable reactive Class 4	Liquid	Maximum allowable quantity
	Solid	Maximum allowable quantity
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an *approved* automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or *approved* for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

Reason: The Table is reconfigured to isolate Oxidizing Gas, which is not further classified, from Class 3 and Class 4 liquid and solid oxidizers which are defined as HPM. This reconfiguration also clarifies for the reader that Class 1 and Class 2 liquid and solid oxidizers are not considered, which is consistent with the treatment of Unstable (reactives) and Water Reactives in this Table.

It is presumed that the current quantities allowed for Liquid and Solid Oxidizers in Table 2705.2.2 is the aggregate of both Class 3 and 4 Oxidizers at a workstation. Class 4 Oxidizers are defined as materials that have the potential to undergo an explosive reaction and they are limited by Table 2704.2.2.1 in a single fabrication area to the Maximum Allowable Quantity provided for in Table 5003.1.1(1), which is 0.25 pounds and 0.25 pounds (0.025 gallons), respectively. Without clarification, the reader can misinterpret IFC Table 2705.2.2 to allow for 12 gallons of Class 4 Oxidizer liquids in open use and 60 gallons of Class 4 Oxidizer liquids in closed use in a single workstation in Group H-5. And similarly, 20 pounds of Class 4 Oxidizer solids.

This proposal does not intend to make any changes to the quantities currently allowed, but it does:

1)Align the hazard categories for oxidizing materials with IFC Table 5003.1.1(1),2)Clarify that the quantities listed apply to the aggregate of Class 3 and Class 4 Oxidizer liquids and solids, and3)Adds a new row for Class 4 Oxidizer liquids and solids with maximum quantity limits aligned with the maximum quantities allowed in a single fabrication area in Group H-5 by IFC Table 2704.2.2.1.

The quantity of Class 4 Unstable reactive liquids and solids allowed at a workstation in Group H-5 is also clarified. Both Class 3 and Class 4 Unstable (reactive) liquids and solids are defined as HPM, but only Class 3 Unstable reactive is listed in Table 2705.2.2. IFC Table 2704.2.2.1 currently allows up to the Maximum Allowable Quantity (MAQ) of Class 4 Unstable liquids and solids listed in IFC Table 5003.1.1(1) in a single fabrication area in Group H-5. But, because the Class 4 Unstable (reactive) hazard classification does not appear in Table 2705.2.2, the reader is led to question whether Class 4 Unstable (reactive) materials are allowed at workstations in Group H-5.

The proposal clarifies the code by adding the Class 4 Unstable (reactive) hazard category to Table 2705.2.2 and aligns the maximum quantities for Class 4 Unstable (reactive) liquids and solids with the maximum quantities currently allowed by IFC Table 2704.2.2.1 for these materials in a single fabrication area.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the Reason Statement, the proposal clarifies the intent of the current code requirements.

F194-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This was disapproved based upon the action on F190-24 which more broadly references NFPA 318. (Vote 14-0)

F194-24

Individual Consideration Agenda

Comment 1:

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Reason: F194-24 was Disapproved at my request because F190-24 deleted the table from the IFC. However, we have submitted a Public Comment to retain the table in the IFC. As such, the original proposal now has relevance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 675

F197-24

IFC: 3006.1, 3006.2 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

3006.1 Protection study~~Required protection.~~ The *owner* shall conduct a study of the oven in accordance with Section 9.1 of NFPA 86 to determine the need for a fire protection system in Class A ~~and B~~ ovens ~~that contain, or are utilized for the processing of, combustible materials shall be protected by an *approved automatic fire-extinguishing system* complying with Chapter 9~~where any of the following conditions exist.

1. Oven is constructed of combustible materials.
2. Workpieces are constructed of combustible materials.
3. Devices for moving or supporting the workpiece are constructed of combustible materials.
4. Ancillary materials applied to or within the workpiece are combustible.

Exceptions:

1. Small tabletop ovens used in laboratory facilities.
2. Nonwalk-in ovens that are less than 4 feet (1219 mm) in length and width.

Add new text as follows:

3006.2 Required protection. Where the study in Section 3006.1 indicated that fire protection is required, the fire protection system shall be in accordance with Chapter 9.

Reason: Changes are based upon FM guidance (FM Datasheet 6-9), current requirements in NFPA 86 and response from ICC Staff (see attached). The requirement for fire protection is based upon the combustibility of the contents of the oven, or the oven itself. A study would determine if there is sufficient combustibles on, or in, the workpiece to require fire protection. Some liquid and powder coated workpieces do not contain enough ignitible material to require fire protection. Class B oven was removed as, by definition, there are no combustibles. The proposed language also identifies who is responsible for the study and points to the appropriate section in NFPA 86 which includes requirements and supporting information in the annex.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification where fire protection is required. With the revised language it may be possible that this would reduce the cost as the hazard is more specifically addressed.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This seemed to be a reasonable way to determine if sprinklers were required versus simply requiring protection. However it was suggested that this could be reversed to simply state that sprinklers are require but alternatively a study could be undertaken. (Vote 13-1)

F197-24

Individual Consideration Agenda

Comment 1:

Proponents: Elley Klausbruckner, Klausbruckner & Associates, Self (jm@klausbruckner.com) requests Disapproved

Reason: We are asking for disapproval of Code Change F197-24. The proposed code change forces EVERY owner of an industrial Class A oven to conduct a study in accordance with NFPA 86, Section 9.1 if one of the four conditions in Section 3006.1. The following is Section 9.1 of NFPA 86 **in its entirety**:

"***9.1 * General.*** *A study shall be conducted to determine the need for fixed or portable fire protection systems for ovens, furnaces, or related equipment.*
9.1.1 *The determination of the need for fire protection systems shall be based on a review of the fire hazards associated with the equipment.*

9.1.2 *Unless otherwise agreed to by the manufacturer, installer, or maintainer, the user shall be responsible for conducting the fire protection study required by Section 9.1. (See Annex F.)*

9.1.3 *Where determined to be necessary, fixed or portable fire protection systems shall be provided.*

***9.1.4 ** Written procedures shall be established outlining actions to be taken in response to an unintended fire involving an oven system*."

Do we really need a reference to NFPA 86 for this? Does this improve the codes in any way when the fire code official is allowed to require a technical opinion and report in accordance with IFC Section 104.2.2? Referencing NFPA 86 in this case does not add anything of substance to the codes. It would be far better to incorporate regulations directly into Chapter 30.

Bibliography: NFPA 86 [2023 Ed.], Standard for Ovens and Furnaces, National Fire Protection Association.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 753

F198-24

IFC: SECTION 105, 105.5.51, [A] 105.6.25, SECTION 3103, 3103.4

Proposed Change as Submitted

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Self

2024 International Fire Code

SECTION 105
PERMITS

Revise as follows:

105.5.51 Temporary membrane structures, special event structures and tents. An operational permit is required to operate ~~an air-supported~~ a temporary membrane structure, a temporary *special event structure* or a tent having an area in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents, curtains and extensions attached thereto, when used for funeral services.
3. Tents open on all sides, which comply with all of the following:
   3.1. Individual tents having a maximum size of 700 square feet (65 m^2).
   3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

[A] 105.6.25 Temporary membrane structures and tents. A construction permit is required to erect ~~an air-supported~~ a temporary membrane structure, a temporary special event structure or a tent in accordance with Section 105.5.51.

SECTION 3103
TEMPORARY TENTS AND MEMBRANE STRUCTURES

Revise as follows:

3103.4 Use period. Temporary *tents*, air-supported, air-inflated or ~~tensioned~~ tensile *membrane structures* shall not be erected for a period of more than 180 days within a 12-month period on a single premises.

Reason: This proposal is intended to make the IFC internally consistent, with respect to its application to temporary structures.

In the process of investigating the application of the building code and the fire code to temporary structures for a separate proposal, it became apparent that there were some discrepancies in the provisions in the 2024 IFC:

- Sections 105.5.51 and 105.6.25 require construction and operational permits for air supported temporary membrane structures. However, Section 3101.1 appears to scope in all membrane structures:

  3101.1 Scope. *Tents*, temporary special event structures and *membrane structures* shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are

applicable to temporary special event structures. The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.

- In addition, Section 3103.4 prohibits "tensioned" membrane structures from being permitted for more than 180 days within 12 months. However, since neither Section 105.5.51 nor 105.6.25 require permits for these, they aren't really regulated by the IFC--there is no "code path" (i.e., legal authority) that gets someone to 3101 or 3103.4.

This proposal revises Sections 105.5.51 and 105.6.25 to encompass all membrane structures, consistent with Section 3101.1. This takes the "lowest common denominator" approach, i.e., takes the broadest interpretation as to what is regulated by the IFC. The changes to Sections 105.5.51 and 105.6.25 will also resolve the code path issue in Section 3103.4. A more strict approach (not taken in this proposal) would have been to revise Sections 3101.1 and 3103.4 to only apply to air-supported temporary membrane structures, consistent with the current provisions in Sections 105.5.51 and 105.6.25.

Finally, Section 3103.4 refers to "tensioned" membrane structures, but the defined term is "tensile" membrane structures. This proposal revises Section 3103.4 to refer to the defined term.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just makes the IFC internally consistent as far as its scoping of temporary structures is concerned. There are sections in the 2024 IFC that appear to regulate temporary structures more broadly than a tight technical reading of the code would indicate, and jurisdictions who have been enforcing the code with that broad view will see no change in how they approach permits for these structures.

F198-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee did not agree with removing the specific term "air supported" as it will make enforcement more difficult for larger inflated play structures. (Vote 11-2)

F198-24

Individual Consideration Agenda

Comment 1:

IFC: 105.5.51, [A] 105.6.25

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

105.5.51 Temporary membrane structures, special event structures and tents. An operational permit is required to operate a temporary membrane structure, including an air-supported structure, a temporary *special event structure* or a tent having an area in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents, curtains and extensions attached thereto, when used for funeral services.
3. Tents open on all sides, which comply with all of the following:
   3.1. Individual tents having a maximum size of 700 square feet (65 m^2).
   3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

[A] 105.6.25 Temporary membrane structures and tents. A construction permit is required to erect a temporary membrane structure, including an air-supported structure, a temporary special event structure or a tent in accordance with Section 105.5.51.

Reason: This comment responds to comments received from the Committee and from testimony in opposition from the floor:

- The intent of the code is to regulate all temporary membrane structures (see 2024 IFC Section 3101.1 and the reason statement for the original proposal). This intent was verified with the opposition testifier after the item was heard at the CAH. In that way, the change made in the last cycle to add the words "air-supported" narrowed the scope to just air-supported temporary membrane structures, which conflicts with Section 3101.1. The original proposal undoes what appears to be an unintentional change in scope and removes the conflict between Sections 105 and 3101.
- The Committee and opposition testifier want the code to be clear that bouncy-houses (a type of air-supported structure) are regulated by this section. This revision maintains the originally-proposed language that requires all temporary membrane structures to obtain operational and construction permits but emphasizes temporary air-supported structures (which would include bouncy-houses) are included as a type of temporary membrane structure. Note that this comment uses the defined term, "air-supported structure" instead of "air-supported membrane structure."
- One member of the Committee suggested that the exceptions for operational permits should be extended to construction permits as well. There are several reasons why this comment does not address the suggestion:
  - There are no exceptions in 2024 IFC Section 105.6.25 regarding construction permits for temporary membrane structures and tents. Instead, the current text points back to the operational permits section ("...in accordance with Section 105.5.51.") With that pointer, the current code is clear that if an exception in Section 105.5.51 applies for operational permits, then a construction permit would also be exempted.
  - If, however, one accepts the statement that the code is "broken," as suggested by the Committee member, that is a problem with the existing code language--the original proposal did not change that language, and therefore, did not break it.
  - The proposal only affects temporary membrane structures. The existing exceptions for operational permits in Section 105.5.51 (and per the reasoning above, to construction permits) only apply to tents, which would not fall under the definitions for membrane structures.

Note that this comment revises but does not replace the original proposal, in order to maintain the change made to Section 3103.4 that corrects the terminology from "tensioned membrane structure" to the defined term, "tensile membrane structure." There was no testimony from the floor or comments from the dais in opposition to this part of the change.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No change from cost impact statement for original proposal.

Comment (CAH2)# 17

F199-24

IFC: 3103.1, 3103.6.1, 3103.8, 3103.8.2, 3103.8.3, 3103.8.4, 3104.1, 3105.1, 3105.4

Proposed Change as Submitted

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org); Don Scott, Don Scott Consulting, PLLC, ASCE/SEI Ad Hoc Committee for Loads on Temporary Structures (don@donscottconsulting.com)

2024 International Fire Code

Revise as follows:

3103.1 General. *Tents* and *membrane structures* used for temporary periods shall comply with this section, ~~and~~Section 3107, and with the *International Building Code* as applicable. Other temporary structures erected for a period of 180 days or less shall comply with the *International Building Code*.

3103.6.1 Inspection report. Where required by the *fire code official* or *building official*, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.8 Structural stability and anchorage required. *Tents* or *membrane structures* and their appurtenances shall be designed and installed ~~to withstand the elements of weather and prevent collapsing~~ in accordance with Sections 3103.8.1 through 3103.8.4. Documentation of structural stability shall be furnished to the *fire code official*.

3103.8.2 Tents and membrane structures greater than one story. *Tents* and *membrane structures* exceeding one story shall be designed and constructed to comply with ~~Sections 1606 through 1609 of~~ the International Building Code.

3103.8.3 Tents and membrane structures greater than 7,500 square feet. *Tents* and *membrane structures* greater than 7,500 square feet (697 m^2) shall be designed and constructed to comply ~~with Sections 1606 through 1609 of~~ the International Building Code.

3103.8.4 Tents and membrane structures with an occupant load greater than 1,000. *Tents* and *membrane structures* with an occupant capacity greater than 1,000 persons shall be designed and constructed to comply with ~~Sections 1606 through 1609 of~~ the International Building Code.

3104.1 General. *Tents* and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108, and~~. Permanent *tents* and *membrane structures*~~ shall also comply with the *International Building Code*.

3105.1 General. Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and ~~ANSI E1.21~~the *International Building Code*.

3105.4 Required documents. The following documents shall be submitted to the *fire code official* and the building official for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with Section 3103 of the *International Building Code* ~~and ANSI E1.21~~ where applicable. *Construction documents* shall include:

   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.

   1.2. Detailed construction and installation drawings.

   1.3. Design calculations.

   1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.

   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.

   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.

2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the *construction documents*, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

Reason: This code change proposal is being submitted to align the IFC with the current provisions in the IBC regarding temporary structures.

In Group B of the last cycle, a committee organized by ASCE/SEI submitted code change proposal S116-22, which was approved as modified by public comments by the membership. S116-22 added provisions for modified loads on public-occupancy temporary structures into 2024 IBC 3103. The provisions also included requirements for installation and maintenance inspections, controlled occupancy procedures, and durability. The industry standards for these types of structures (ANSI E1.21 and ANSI ES1.7) were adopted by reference in IBC Chapter 35.

This proposal will align the next edition of the IFC with the new IBC provisions by:

- Pointing to the IBC or the building official as needed (Sections 3103.1 and 3103.6.1);
- Clarifying that larger tents and membrane structures must comply with more than just the listed sections in the IBC (Sections 3103.8.2 through 3103.8.4);
- Clarifying that compliance with the IBC is required for both temporary and permanent tents and membrane structures (Section 3104.1); and
- Deleting a now-unnecessary reference to ANSI E1.21 and pointing to the IBC (Sections 3105.1 and 3105.5 Item 1);

The ad hoc group that worked on the IBC last cycle, continuted this effort with this coordinating code change for this cycle. This code change will align the IFC with what is currently in the 2024 IBC for temporary structures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since this is just aligning the 2027 IFC with the requirements already in the 2024 IBC, there will be no impact on the cost of construction. (A cost impact statement for the IBC changes was included in S116-22.)

F199-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as there was concern that the revisions will create a loop between the IBC and IFC for temporary structures with the references to the IBC. Also the references to the IBC will be more general versus referencing specific sections of Chapter 16 which may cause confusion. (Vote 13-0)

F199-24

Individual Consideration Agenda

Comment 1:

IFC: 3103.1, 3103.6.1, 3103.8, 3103.8.2, 3103.8.3, 3103.8.4, 3104.1, 3105.1, 3105.4

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org); Don Scott, Don Scott Consulting, PLLC, ASCE/SEI Ad Hoc Committee for Loads on Temporary Structures (don@donscottconsulting.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

3103.1 General. *Tents* and *membrane structures* used for temporary periods shall comply with this section, Section 3107~~, and with the *International Building Code* as applicable~~. Membrane structures erected on a building, balcony, deck, or any other structure shall comply with Section 3101 of the *International Building Code.* Other temporary structures erected for a period of 180 days or less shall comply with the *International Building Code*.

3103.6.1 Inspection report. Where required by the *fire code official* or *building official*, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.8 Structural stability and anchorage required. *Tents* or *membrane structures* and their appurtenances shall be designed and installed in accordance with Sections 3103.8.1 through 3103.8.4. Documentation of structural stability shall be furnished to the *fire code official*.

3103.8.2 Tents and membrane structures greater than one story. *Tents* and *membrane structures* exceeding one story shall be designed and constructed to comply with Sections 3103.6 through 3103.8 of the *International Building Code*.

3103.8.3 Tents and membrane structures greater than 7,500 square feet. *Tents* and *membrane structures* greater than 7,500 square feet (697 m^2) shall be designed and constructed to comply Sections 3103.6 through 3103.8 of the *International Building Code*.

3103.8.4 Tents and membrane structures with an occupant load greater than 1,000. *Tents* and *membrane structures* with an occupant capacity greater than 1,000 persons shall be designed and constructed to comply with Sections 3103.6 through 3103.8 of the *International Building Code*.

3104.1 General. *Tents* and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108, and shall also comply with the *International Building Code*.

3105.1 General. Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and Sections

3103.6 through 3103.8 of the *International Building Code*.

3105.4 Required documents. The following documents shall be submitted to the *fire code official* and the building official for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with Section 3103 of the *International Building Code* where applicable. *Construction documents* shall include:
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   1.2. Detailed construction and installation drawings.
   1.3. Design calculations.
   1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.
   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.
2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the *construction documents*, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

Reason: This Comment is being submitted to modify the original code change proposal in response to the committee feedback. This code change is still needed to align the IFC Section 3103, 3104, 3105 with the current provisions in the IBC Section 3103 regarding temporary structures. ****NOTE that this is very confusing that Chapter 31 is discussion for both IFC and IBC – and the sections 3103 used for each code also!**

This proposal for the IFC points to 2024 IBC Section 3103 provisions for reduced structural loading on temporary structures. Without this coordination and pointers to IBC 3103, the IFC would require full structural loading for temporary structures as pointers to IBC Section 1606 through 1609 – which are higher loads than the IBC requires.

Summary of 2024 Code Cycle Actions: In Group B of the last 2024 I-Code cycle, a committee organized by ASCE/SEI submitted code change proposal S116-22, which was approved as modified by public comments by the membership. S116-22 added provisions for modified loads on public-occupancy temporary structures into 2024 IBC 3103. The provisions also included requirements for installation and maintenance inspections, controlled occupancy procedures, and durability. The industry standards for these types of structures (ANSI E1.21 and ANSI ES1.7) were adopted by reference in IBC Chapter 35.

Summary of this proposal: The code change will align the next edition of the IFC with 2024 IBC Section 3103 provisions by:

- Pointing to the IBC Section 3101 or the building official to align with the IBC (in IFC Sections 3103.1 and 3103.6.1);
- Removing vague language "withstand elements of weather and prevent collapse" (in IFC 3103.8) and adding specific pointers in lower IFC Sections 3103.8.2 through 3103.8.4;
- Removing pointers to IBC Section 16 (in IFC 3103.8.2 through 3103.8.4), which is for full structural loading provisions and replacing with IBC Section 3103.6 through 3103.8;
- Clarifying that larger tents and membrane structures must comply with more than just the listed sections in the IBC (in IFC Sections 3103.8.2 through 3103.8.4); and
- Clarifying that compliance with the IBC is required for both temporary and permanent tents and membrane structures (in IFC Section 3104.1).

The following is in the scope of the existing provisions within the 2024 IBC:

2024 IBC 3103.1 General.

The provisions of Sections 3103.1 through 3103.8 shall apply to *structures* erected for a period of less than 180 days. Temporary *special event structures*, *tents*, umbrella *structures* and other membrane *structures* erected for a period of less than 180 days shall also comply with the *International Fire Code* . *Temporary structures* erected for a longer period of time and *public-occupancy temporary structures* shall comply with applicable sections of this code.

The ASCE 7 ad hoc group that worked on the 2024 IBC Section 3103 provisions last cycle, continued this effort with this coordinating code change for the Fire Code in this cycle. Due to the nature of the ICC Code Cycles, 2024 Group B changes could not be coordinated with 2024 Group A. This code change will align the IFC with what is currently in the 2024 IBC for temporary structures and therefore reduce the loads required for design of temporary structures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since this is just aligning the 2027 IFC with the requirements already in the 2024 IBC, there will be no impact on the cost of construction. (A cost impact statement for the IBC changes was included in S116-22.)

Comment (CAH2)# 114

F201-24

IFC: 3104.1, 3104.2, 3104.3, 3104.4

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

3104.1 General. *Tents* and *membrane structures*, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108. Permanent *tents* and *membrane structures* shall also comply with the *International Building Code*.

Revise as follows:

3104.2 Flame propagation performance testing and certification. Before a permit is granted, the *owner* or agent shall file with the *fire code official* ~~a certificate~~ an affidavit provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The affidavit ~~certificate~~ shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 2 of NFPA 701. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701. The affidavit ~~certificate~~ shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.

3104.3 Label. *Membrane structures* or *tents* shall have a permanently affixed label bearing the following information:

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame-retardant treatment was last applied to the fabric or material, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

3104.4 Affidavit. The affidavit required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

Reason: Section 3104.4 states that the "affidavit" required in section 3104.2 shall contain certain information. In actual fact, section 3104.2 does not contain the word "affidavit" but the word "certificate" and requires that a certificate provide all the relevant information. Clearly the two words are intended to have the same meaning. Since the requirement for an "affidavit" associated with this testing is also called for in the section on inflatables (in 3106), this proposal simply changes the word "certificate" for the word "affidavit" in section 3104.2. The use of the word "affidavit" in section 3104.4 was originally proposed by the industry using these types of tents for events.

Grammatically, the use of the word "certificate" in the same sentence as the word "certified" is relatively poor use of language: "Before a permit is granted, the owner or agent shall file with the fire code official a **certificate** provided by the product manufacturer to verify that the materials have been tested and **certified** by an approved testing laboratory."

This is not the sole location where the term "affidavit" is used in ICC codes. It is actually also used in the IBC and in the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Simply changes words meaning the same.

F201-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:

3104.2 Flame propagation performance testing and certification. Before a permit is granted, the *owner* or agent shall file with the *fire code official* a certificate ~~an affidavit~~ provided by the product manufacturer to verify that the materials have been tested and certified by an *approved* testing laboratory. The certificate ~~affidavit~~ shall indicate that the floor coverings, *tents*, *membrane structures* and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance of Test Method 2 of NFPA 701. Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of Test Method 1 or Test Method 2 of NFPA 701, as applicable. Alternatively, the materials shall be treated with a flame retardant in an *approved* manner and meet the flame propagation performance criteria of the applicable test method of NFPA 701. The certificate ~~affidavit~~ shall indicate compliance with the testing requirements of NFPA 701, Chapter 16. The flame propagation performance criteria shall be effective for the period specified by the permit.
3104.4 ~~Affidavit~~ Certificate. The certificate ~~affidavit~~ required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

3106.3 Combustible materials. The materials used in the construction of the inflatable amusement device shall meet the flame propagation criteria of Test Method 2 of NFPA 701. Additionally, a label and a certificate ~~affidavit~~ containing the information required in Sections 3104.3 and 3104.4 of this code shall be permanently affixed to the device.

Committee Reason: This proposal was approved based upon the proponents reason statement. The modification simply revises the term "affidavit" to "certificate." An affidavit is a much more complex legal process that is not considered necessary in this application. (Vote 14-0)

F201-24

Individual Consideration Agenda

Comment 1:

IFC: 3104.3

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

3104.3 Label. *Membrane structures* ~~or~~ and *tents* shall have a permanently affixed label bearing the following information:
Exception: A certificate or documentation from the manufacturer is acceptable for existing membrane structures and tents not provided with a label at the time of manufacturing.

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the *tent* or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame-retardant treatment was last applied to the fabric or material, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

Reason: The original proposal was Approved as Modified at the CAH 1. This comment merely adds the option for the use of a certificate document in lieu of the label attached to the membrane structure for those older devices which were not provided with a label when manufactured. hundreds of membrane structures have been manufactured with only a certificate indicating they are flame resistant. in those cases, it is appropriate to accept the certificate in lieu of mandated a label attached to the membrane structure.

These existing membrane structures do not bear a label, however they do have a certificate stating acceptable their fire-resistant characteristics. This exception will allow the use of these older membrane structures when they can produce a certificate, but don't have an attached label.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The is an editorial change that affects the inspection process. It does not affect the construction process.

Comment (CAH2)# 561

F203-24

IFC: SECTION 202, 3105.3, 3105.4, 3107.4.1, ANSI Chapter 80 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Richard Nix, Entertainment Services and Technology Association (ESTA), ESTA, and the Event Safety Alliance (ESA) (rnix@zoomtown.com)

2024 International Fire Code

Revise as follows:

TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground-supported structure, platform, stage, stage scaffolding or rigging, canopy, tower, ~~supporting audio or visual effects equipment~~ or similar structures supporting entertainment-related equipment or signage for a special event. ~~not regulated within the scope of the *International Building Code*.~~

3105.3 Use period. Temporary special event structures erected in accordance with ANSI E1.21 shall not be erected for a period of more than 180 days. ~~six consecutive weeks.~~

3105.4 Required documents. The following documents shall be submitted to the *fire code official* and the building official for review before a permit is *approved*:

1. Construction documents: *Construction documents* shall be prepared by a *registered design professional* in accordance with the *International Building Code* and ANSI E1.21 where applicable. *Construction documents* shall include:
   1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   1.2. Detailed construction and installation drawings.
   1.3. Design calculations.
   1.4. Operating limits of the structure explicitly outlined by the *registered design professional* including environmental conditions and physical forces.
   1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.
2. Designation of responsible party: The *owner* of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the *construction documents*, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the *fire code official*.
3. Operations management plan: The operations management plan shall comply with the requirements of ANSI E1.21, and shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the *construction documents*.

3107.4.1 Public safety plan for gatherings. A public safety plan shall be prepared where required by Section 403.11.2. The public safety plan shall include the operations management plan required by Section 3105.4 item 3, and a weather preparedness plan in accordance with ANSI ES1.7. The public safety plan shall be submitted to the *fire code official* with the application for an operational permit as required by Section 3107.2.2.

Add new standard(s) as follows:

ANSI

American National Standards Institute
25 West 43rd Street, 4th Floor
New York, NY 10036

ES1.7-2021 Event Safety Requirements - Weather Preparedness
3107.4.1

Reason:

FCAC:

1. The revised definition harmonizes with the IBC definition.
   [BG]SPECIAL EVENT STRUCTURE. Any ground-supported *structure*, *platform, stage, stage* scaffolding or rigging, *canopy*, tower or similar *structure* supporting entertainment-related equipment or signage.

   [BS]TEMPORARY EVENT.A single use during the *service life* of a *public-occupancy temporary structure* at a given location that includes its installation, inspection, use and occupancy, and dismantling.

   [BS]TEMPORARY STRUCTURE.Any *building* or *structure* erected for a period of 180 days or less to support *temporary events*. *Temporary structures* include a range of *structure* types (*public-occupancy temporary structures*, temporary *special event structures*, *tents*, umbrellas and other membrane *structures*, *relocatable buildings*, temporary *bleachers*, etc.) for a range of purposes (storage, equipment protection, dining, workspace, assembly, etc.).
2. The change in use period is now consistent with both IBC and ANSI E1.21. ANSI E1.21 has been revised to incorporate the new IBC design load requirements, thereby eliminating the 6-week limitation.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website.

Richard Nix:

1. The revised definition harmonizes with the IBC definition.
2. The change in use period is now consistent with both IBC and ANSI E1.21. ANSI E1.21 has been revised to incorporate the new IBC design load requirements, thereby eliminating the 6-week limitation.
3. The change in operational requirements enhances the public safety plan, if required, by including the Operations Management Plan information, and the weather preparedness plan information, providing an approved ANSI standard as a reference for the weather preparedness details.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The definition change is in coordination with the IBC 2024 requirements. The change from '6weeks' to '180 days' will reduce costs. The adoption of ANSI ES1.7 Event Safety - Weather Preparedness may increase costs of compliance but is considered industry practice and is not related to construction costs.

F203-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This was approved as it provides consistency with the 2024 IBC. There was some concern with the jump from 42 days to 180 days. (Vote 10-4)

F203-24

Individual Consideration Agenda

Comment 1:

IFC: 3105.3

Proponents: Jonathan Siu, Jon Siu Consulting, LLC, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

3105.3 Use period. Temporary special event structures erected in accordance with ANSI E1.21 shall not be erected for a period of more than ~~180 days~~ six consecutive weeks.

Reason: This proposal changed the time period of a "special event" from six consecutive weeks to 180 days. We do not agree that the use period for special events structures should be aligned with the period for other temporary structures.

- While "special event" is not defined anywhere in the I-Codes, our understanding is it is intended to be applied to events that occur over a very short period of time, such as a weekend or a few weekends. Travelling circuses, revival tent meetings, political rallies, concerts by very popular artists, travelling fairs and carnivals, and some sports-related events (e.g., Wrestlemania, or the NFL-sponsored carnival-like event before the opening game of the season after the Seattle Seahawks won the Super Bowl) come to mind when we think of "special events."
- The lack of definition for "special event" means that in the current IFC, the only distinction between special event structures and all other temporary structures is the six consecutive week limitation. By making the requirements for special events structures the same as all other temporary structures, they are no longer "special." If that is the case, by extension, is there is no need for the special requirements in IFC Section 3105, which means the whole of Section 3105 could be deleted. We do not agree that Section 3105 should be deleted, and therefore, the distinction between special event structures and other temporary structures should be maintained, at least until a definition for "special event" is adopted into the I-codes.
- The documentation and inspections required in IFC 3105 for temporary special events structures are not the same as is currently required for temporary structures in the IBC, particularly in the area of controlled occupancy procedures for Public Occupancy Temporary Structures. While IFC 3105.2 says a permit must be obtained from both the fire official and the building official, the difference in the requirements will cause confusion and conflict for designers and regulators.

We support the change to the definition and have no objection to the other proposed changes, although the reference to ES1.7 will likely cause confusion with the different requirements in the IBC. However, we do not support the change to the use period.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Approving this comment would return the code to its current state. There would be no change in costs as compared to the current code.

Comment (CAH2)# 97

F205-24

IFC: 3203.9, 3203.9.1, 3203.9.2, FIGURE 3203.9(1), SECTION 202 (New)

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

Revise as follows:

3203.9 ~~Limited quantities of~~ Commodities containing Group A plastics ~~in mixed commodities~~. ~~Figures 3203.9(1) and 3203.9(2) shall be used to determine the commodity classification based on the quantity of Group A plastics in the following situations:~~

1. ~~The product is not listed in Table 3203.8 and contains Group A plastics.~~
2. ~~The commodity contains Group A plastics and is not classified as high hazard in Table 3203.8.~~
3. ~~The product listing in Table 3203.8 does not specifically include packaging, and the packaging material includes Group A plastics.~~

Commodities containing any amount of Group A plastics shall be classified as a Group A plastic commodity, unless either of the following apply:

1. The product is listed in Table 3203.8 and the listing specifically includes Group A plastics or packaging material of Group A plastics.
2. The commodity is evaluated in accordance with Section 3203.9.1 based on the amount of Group A plastics contained in the commodity and the result is other than Group A plastics.

3203.9.1 Classifying mixed commodities with limited Group A plastics. The percentage of Group A plastics determined in accordance with Section 3203.9.2 shall be used in Figures 3203.9(1) and 3203.9(2). ~~Results from Figure 3203.9(1) must be compared to results from Figure 3203.9(2) and the commodity will be classified with the highest commodity classification.~~ Commodities with products in cartons, boxes or crates shall use Figure 3203.9(1). Commodities with exposed Group A plastics shall use Figure 3203.9(1).
Figures 3203.9(1) and 3203.9(2) shall not be used to reduce the commodity classification shown in Table 3203.8.

3203.9.2 Percentage of Group A plastics. The pallet, if any, shall not be included when measuring the weight of the commodity (W_{PU} ~~or W_{PE}~~) or the volume of the commodity (V_{PE}). The pallet, if any, shall be included when measuring the weight of the entire load (W_L) or the volume of the entire load (V_L). **Exception:** Where noncombustible pallets are used, the pallets shall not be included in the volume and weight calculations.
The percentage by weight of Group A unexpanded plastics in the load shall be calculated in accordance with Equation 32-1.
The percentage by volume of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-2.
~~The percentage by weight of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-3.~~

$$P_{WU} = W_{PU} / W_L \quad \textbf{(Equation-32-1)}$$

where:

P_{WU} = Percentage by weight of Group A unexpanded plastic.

W_{PU} = Weight of Group A unexpanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, including the weight of the pallet, if any.

$$P_{VE} = V_{PE} / V_L \quad \textbf{(Equation-32-1)}$$

where:

P_{VE} = Percentage by volume of Group A expanded plastic.

V_{PE} = Volume of Group A expanded plastic in the commodity, not including the volume of the pallet, if any.

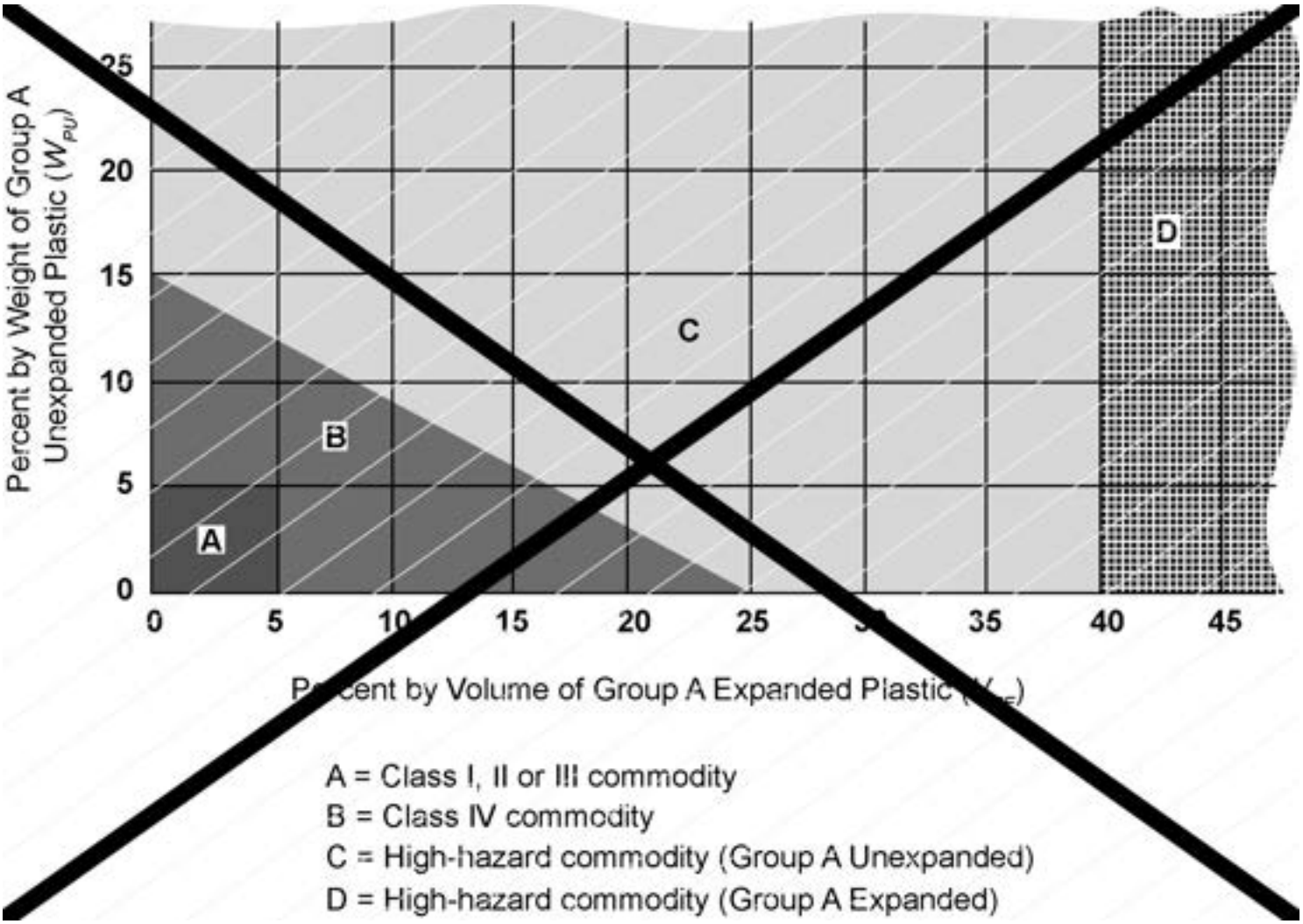
V_L = Volume of the entire load, including the volume of the pallet, if any.

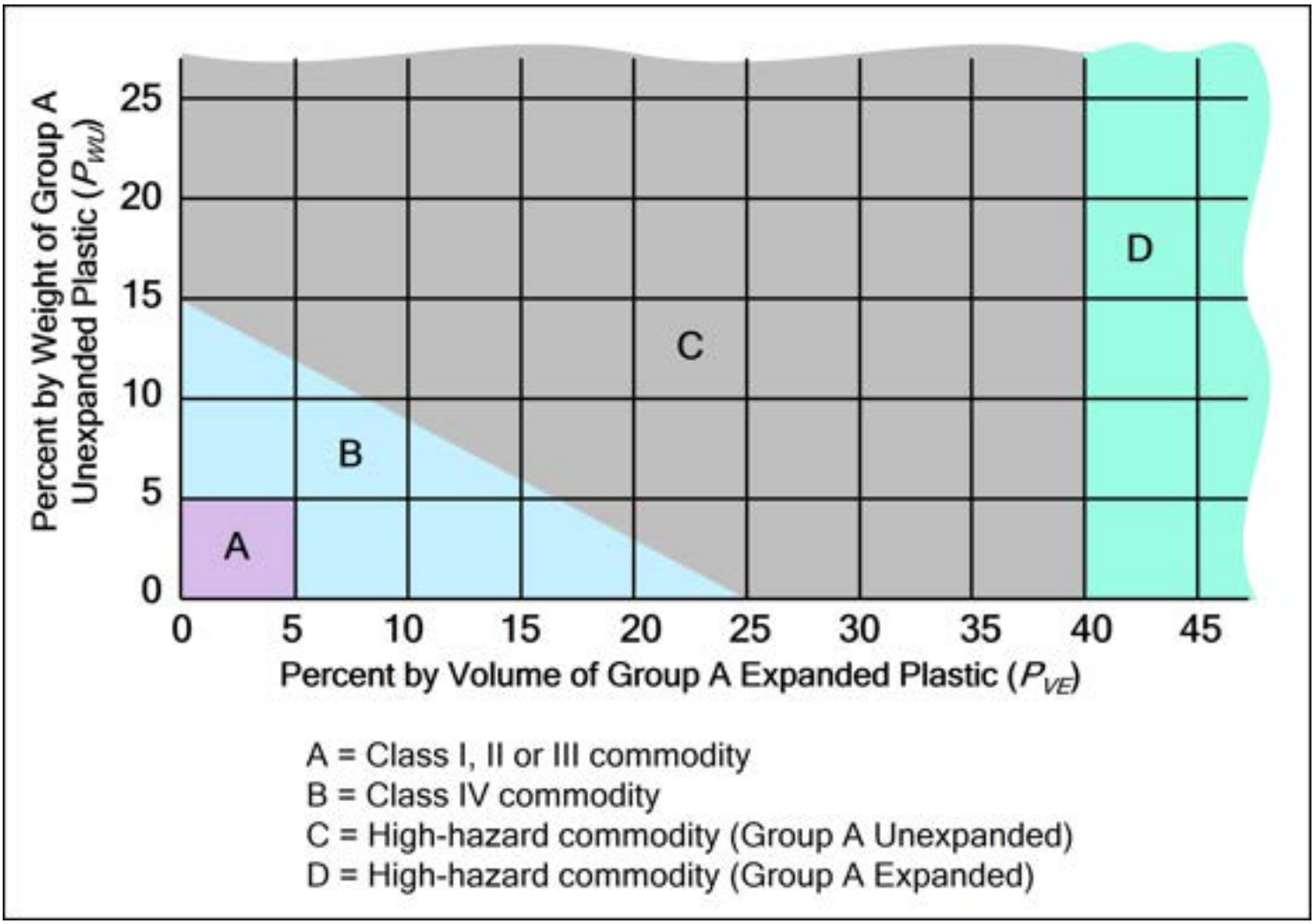
~~$P_{WE} = W_{PE} / W_L$~~ ~~**(Equation 32-3)**~~where:

~~P_{WE} = Percentage by weight of Group A expanded plastic.~~

~~W_{PE} = Weight of Group A expanded plastic in the commodity, not including the weight of the pallet, if any.~~

~~W_L = Weight of the entire load, including the weight of the pallet, if any.~~





a. This figure is used to determine the commodity classification of a mixed commodity with Group A plastics in a package or crate.

b. The following is an example of how to apply Figure 3203.9(1): A pallet load consists of a Class III commodity in cardboard boxes with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5 percent. Using Equation 32-2, the volume of expanded Group A plastic is 15 percent. This commodity is classified as a Class IV commodity. If the volume of the expanded Group A plastic is increased to 20 percent, the classification changes to a high-hazard (Group A unexpanded) commodity. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.

FIGURE 3203.9(1) EVALUATION OF CARTONED COMMODITIES CONTAINING GROUP A PLASTICS[a, b]

Add new definition as follows:

EXPOSED GROUP A PLASTIC. Commodities containing any amount of Group A plastics that are not within packaging, cartons or coverings that can absorb water to affect the burning hazard of the commodity. Encapsulated loads containing Group A plastic shall be considered exposed Group A plastic. Products containing Group A plastic with a single-thickness paper wrapping shall be considered exposed Group A plastic.

Reason: This proposal clarifies the method for determining whether limited quantities of Group A plastics affect the classification of the commodity.

Section 2303.9 is revised with no technical change. The section is revised to say that commodities containing Group A plastics shall be classified as Group A plastics. This provision has two options: 1) the listing in Table 3203.8 includes a description of the commodity and includes the Group A plastics, and 2) the subsequent figures are used to evaluate the quantity of Group A plastics and determine the

impact provided by those limited quantities.

Figures 3203.9(1) and (2) were revised in the 2021 IFC to alter their use. However, some of the code text needing revision to correlate was missed. This proposal correlates the text with the figures.

Figure 3203.9(1) is revised. The only changes are the parenthetic acronyms for Percentage by Weight of Expanded plastic (PWE) and Percentage by Volume of Unexpanded plastic (PVU). This is done to correlate with the terms in Equations 32-1 and 32-2.

Only one figure is required to complete the calculation of the impact of Group A plastic. Figure 3203.9(1) is used for classifying commodities which are cartoned, boxed, or crated. Figure 3203.9(2) is used for classifying commodities which are exposed. To facilitate this difference, a new definition is added for exposed Group A plastics. This definition is consistent with the definition in NFPA 13.

Both figures compare the weight of unexpanded plastic (Y axis) to the volume of expanded plastic (X axis). The weight of expanded plastics is no longer used in the figures. Equation 32-3 was used to determine the weight of expanded plastics and is no longer needed, so Equation 32-3 is deleted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal correlates the requirements and terms in these sections and adds a definition to assist in their application. It also corrects an editorial error in the 2024 IFC.

F205-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Proposal needs more review as the section is being reversed. I was suggested that the items in Section 3203.9 become exceptions (Vote 8-6)

F205-24

Individual Consideration Agenda

Comment 1:

IFC: 3203.9, 3203.9.1, SECTION 202

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

3203.9 Commodities containing Group A plastics. Commodities containing any amount of Group A plastics shall be classified as a high-hazard Group A plastic commodity~~, unless either of the following apply:~~.

Exceptions:

1. The product is listed in Table 3203.8 and the listing specifically includes Group A plastics or packaging material of Group A plastics.
2. The commodity is evaluated in accordance with Section 3203.9.1 based on the amount of Group A plastics contained in the commodity and the result is other than ~~Group A plastics~~ a high-hazard commodity.

3203.9.1 Classifying mixed commodities with limited Group A plastics. The percentage of Group A plastics determined in accordance with Section 3203.9.2 shall be used in Figures 3203.9(1) and 3203.9(2). Commodities with products in cartons, boxes or crates shall use Figure 3203.9(1). Commodities with exposed Group A plastics shall use Figure ~~3203.9(1)~~3203.9(2).
Figures 3203.9(1) and 3203.9(2) shall not be used to reduce the commodity classification shown in Table 3203.8.

Delete without substitution:

~~**EXPOSED GROUP A PLASTIC.** Commodities containing any amount of Group A plastics that are not within packaging, cartons or coverings that can absorb water to affect the burning hazard of the commodity. Encapsulated loads containing Group A plastic shall be considered exposed Group A plastic. Products containing Group A plastic with a single-thickness paper wrapping shall be considered exposed Group A plastic.~~

Reason: This code change was modified twice by the committee, but then Disapproved at the final vote during CAH 1. The two modifications are included in this comment and include: 1) deletion of the definition of "exposed Group A plastic" since the term is defined in NFPA 13; and 2) the revision in Section 3203.9 to change the Items 1 and 2 to Exceptions 1 and 2. Both of the modifications were discussed and approved and are included here.

An correction is made in Section 3203.9, Exception 2 to reference "high-hazard commodity" rather than Group A plastics. The material already contains Group A plastics and the result from the evaluation under Section 3203.9.1 would be high-hazard commodity if it is to protected as a Group A plastic.

An addition editorial correction is included in Section 3203.9.1. The incorrect figure is referenced, and is corrected to Figure 3203.9(2) for commodities with exposed Group A plastic.

Additionally, there was some confusion as to why the formatting of Section 3203.9 has changed. The reason for the change is because previous to the 2021 IFC both figures were used to determine the commodity classification. Since the 2021, one figure applies to cartoned commodities and one figure applies to exposed commodities, but only figure is used to determine the commodity classification. Even though the figures were changed in the 2021 IFC, the text was not revised to correlate with that change. The only goal of this code change is to correlate the text with the revised figures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal correlates the requirements and terms in these sections and adds a definition to assist in their application. It also corrects an editorial error in the 2024 IFC.

Comment (CAH2)# 791

F210-24

IFC: 3303.1.1, 3303.5, 3303.5.1, 3303.5.2, 3303.5.2.1, 3303.5.2.2, 3303.5.2.3, 3303.5.3, 3303.5.4; IBC: 3302.1.1; IEBC: [F] 1502.1.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

3303.1.1 Components of site safety plans. *Site safety plans* shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with Section 3305.7.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other hazardous materials.
11. Provisions for site security ~~and where required, for a fire watch~~.
12. Changes that affect this plan.
13. Other site-specific information required by the *fire code official*.
14. Provision for a fire watch, where required.

3303.5 Fire watch. Where required by the *fire code official* or the *site safety plan* established in accordance withSection 3303.1, a fire watch shall be provided for building construction, alteration, or demolition and in accordance with Section 3303.6 ~~for building construction~~.

3303.5.1 Fire watch during construction. A fire watch shall be provided during nonworking hours for ~~new construction~~ that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m^2) per story or as required by the *fire code official.*

~~**3303.5.2**~~ **3303.6 Fire watch personnel.** Fire watch personnel shall be ~~provided~~ in accordance with this section.

~~**3303.5.2.1**~~**3303.6.1 Duties.** ~~The primary duty~~ Duties of the fire watch personnel shall be to perform constant patrols, ~~and~~ watch for the occurrence of fire, attempt to control an an incipient stage fire and report the fire in accordance with the site safety plan. The combination of fire watch duties and site security duties shall be permissible. ~~is acceptable.~~

~~**3303.5.2.2**~~ **3303.6.2 Training.** Personnel shall be trained to serve as a~~n on-site~~ fire watch. Training shall include the appropriate type and use of portable fire extinguishers. ~~Fire extinguishers and fire reporting shall be in accordance with Section 3303.6.~~

~~3303.5.2.3~~3303.6.3 **Means of notification.** Fire watch personnel shall be provided with not fewer than one *approved* means for notifying the fire department.

~~3303.5.3~~ 3303.6.4 **Fire watch location ~~and records~~.** The fire watch shall include areas specified by the *site safety plan* established in accordance with Section 3303.

~~3303.5.4~~3303.6.5 **Fire watch records.** Fire watch personnel shall keep a record of all time periods of duty, including the log entry for each time the site was patrolled and each time a structure was entered and inspected. Records shall be made available for review by the *fire code official* upon request.

2024 International Building Code

Revise as follows:

3302.1.1 Components of site safety plans. Site safety plans shall include the following, as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, *standpipes*, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where *approved*, and signage locations in accordance with the *International Fire Code*.
7. Location and safety considerations for temporary heating equipment.
8. Hot-work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of *flammable* and *combustible liquids* and other *hazardous materials*.
11. Provisions for site security ~~and, where required, for a fire watch.~~
12. Changes that affect this plan.
13. Other site-specific information required by the *International Fire Code* .
14. Provision for a fire watch, where required.

2024 International Existing Building Code

Revise as follows:

[F] 1502.1.1 Components of site safety plans. Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.

6. Smoking and cooking policies, designated areas to be used where approved and signage locations in accordance with the International Fire Code.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security ~~and, where required, for a fire watch~~.
12. Changes that affect this plan.
13. Other site-specific information required by the International Fire Code.
14. Provision for a fire watch, where required.

Reason: The intent of this proposal is to provide additional information and clarification for the duties of the fire watch, when it is required by the AHJ or the site safety plan. Currently, the fire watch is listed as a subset of the site security under the site safety plan list of components, which to some didn't seem like an appropriate place for it to be listed. It is important to note, that while the term alterations is being added to section 3303.5, the entire chapter already applies to alterations so there is no substantive changes being made in this proposal. The remaining editorial changes to section 3303.5 through 3303.6.5 are to coordinate with other changes that are being proposed to Chapter 33 of both the International Building Code and the International Fire Code and to clarify the duties and responsibilities of the fire watch personnel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, the changes in this proposal are editorial in nature.

F210-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The overall intent of the proposal was supported however several concerns were raised such as the use of the phrase "incipient stage fire." Additionally, the language in 3303.6.2 may cause legal issues if the occupant is required to respond and they do not. The order in which fire watch personal are taking action appear reversed. It was unclear how this section would apply to alterations when the terms "new construction" are deleted from Section 3303.5.1. (Vote 9-5)

F210-24

Individual Consideration Agenda

Comment 1:

IFC: 3303.5, 3303.5.1, 3303.6, 3303.6.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC

(fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

3303.5 Fire watch. Where required by the *fire code official* or the *site safety plan* established in accordance withSection 3303.1, a fire watch shall be provided for building construction, alteration, or demolition and in accordance with Section 3303.6 .

3303.5.1 Fire watch during construction. A fire watch shall be provided during nonworking hours for new construction that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m^2) per story or as required by the *fire code official.*

3303.6 Fire watch personnel. Fire watch personnel shall be in accordance with this section.

3303.6.1 Duties. Duties of the fire watch personnel shall be to perform constant patrols, watch for the occurrence of fire, ~~attempt to control an an incipient stage fire~~ and report the fire in accordance with the site safety plan. The combination of fire watch duties and site security duties shall be permissible.

Reason: Based on the feedback received from the committee in Orlando, this committee comment deletes the added language regarding the fire watch is responsibly for controlling fires in the incipient stage which raised legal concern if the fire watch fails to comply. The committee comment reinstates the phrase new construction into section 3303.5.1 to alleviate the concerns raised by the committee when the fire watch would apply during construction activity such as an alteration.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No changes have been made that would increase the cost of construction.

Comment (CAH2)# 93

F213-24

IFC: 3304.1.3

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

~~3304.1.3~~3304.1.2.1 ~~Rubbish~~Combustible waste material containers. Where provided rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) ~~are~~ used during work shift for temporary storage of combustible debris, rubbish and waste material, ~~they~~ shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

Reason: The proposal was developed to clarify that the containers referenced in this section are those containers that are used by construction workers that are emptied throughout the day and at the end of every shift. The requirement in this section are not intended to apply to the combustible waster container outside of the building and this added language clarifies that the section applies to the temporary containers used inside the building during work hours. The other editorial change made was to renumber section and revise the title, to continue to use the terms combustible waster material as mentioned in the preceding sections.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There are no anticipated additional costs associated with this change as it is editorial only. This simply clarifies which containers are to be used and is only applicable for combustible debris, rubbish and waste materials that are required to be removed after each work shift.

F213-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Overall the term provided some clarification of intent of rubbish removal during a work shift there were several concerns raised on language that appeared inconsistent. One example pointed out was "combustible waste material containers" versus "rubbish containers." The word "a" was missing between "during" and "work." Generally, it was felt that more clean up is needed. (Vote 9-5)

Individual Consideration Agenda

Comment 1:

IFC: 3304.1.2.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

3304.1.2.1 Combustible waste material containers. Where provided, ~~rubbish~~ combustible waste material containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) used during a work shift for temporary storage of combustible debris, rubbish and waste material, shall have tight-fitting or self-closing lids. Such ~~rubbish~~ combustible waste material containers shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

Reason: Based on the feedback received from the committee in Orlando, this committee comment addresses the concern of using consistent terminology throughout the section and fixes the grammatical mistake pointed out in the proposed language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The committee comment is editorial and will not increase the cost of construction.

Comment (CAH2)# 94

NOTE: F217-24 PART I DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

F217-24 Part I

PART I - IFC: 3307.1, 3307.1.3, 3307.5, 3307.5.1, 3307.5.2; IBC: SECTION 3310, [F] 3310.2, SECTION 3311, [F] 3311.1, [F] 3311.2, [F] 3311.3; IEBC: SECTION 1508, [F] 1508.2, SECTION 1509, [F] 1509.1, [F] 1509.2, [F] 1509.3

PART II - IFC: [BE] 3307.1.2; IBC: 3310.1; IEBC: [BE] 1508.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART II WILL BE HEARD BY THE INTERNATIONAL BUILDING CODE MEANS OF EGRESS COMMITTEE.

2024 International Fire Code

Revise as follows:

3307.1 Required access. *Approved* vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided and maintained by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. ~~Vehicle access shall be maintained until permanent fire apparatus access roads are available.~~

3307.1.3 Maintenance. Required *means of egress* and required *accessible means of egress* shall be maintained during construction and demolition, ~~remodeling or~~ *alterations*, and additions to any building. **Exception:** *Approved* temporary *means of egress* and *accessible means of egress systems* and facilities.

3307.5 Standpipes. In buildings required to have standpipes by Section 905.3.1, not less than one functional standpipe for use by the fire service shall be provided for use during construction. ~~Such~~ Each functional *standpipe* ~~standpipes~~ shall be installed with the building as it progresses and prior to construction exceeding 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at approved locations in or adjacent to *stairways* complying with Section 3307.1.2. As construction continues to progress ~~progresses~~, ~~such~~ the standpipes shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

3307.5.1 Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the building ~~but~~ and shall not be demolished more than one floor below the floor being demolished. Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional.

Exception: Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905.

Delete without substitution:

~~**3307.5.2 Detailed requirements.** Standpipes shall be installed in accordance with the provisions of Section 905. **Exception:** Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.~~

2024 International Building Code

SECTION 3310
MEANS OF EGRESS

Revise as follows:

[F] 3310.2 Maintenance of means of egress. *Means of egress* and required *accessible means of egress* shall be maintained at all times during construction, demolition, ~~remodeling or~~ *alterations* and *additions* to any *building*.

Exception: Existing *means of egress* need not be maintained where *approved* temporary *means of egress* systems and *facilities* are provided.

SECTION 3311
STANDPIPES

Revise as follows:

[F] 3311.1 Where required. In *buildings* required to have *standpipes* by Section 905.3.1, not fewer than one functional standpipe for use by the fire service shall be provided for use during construction. ~~Such~~ Each functional *standpipe* ~~*standpipes*~~ shall be installed with the building as it progresses and prior to construction exceeding 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access. Such *standpipes* shall be provided with fire department hose connections at approved locations in or adjacent to *stairways* complying with Section 3310.1. As construction continues to progress ~~progresses~~, ~~such~~ the *standpipes* shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

[F] 3311.2 Buildings being demolished. Where a *building* is being demolished and a standpipe exists within such a *building*, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the *building* ~~but~~ and shall not be demolished more than one floor below the floor being demolished. Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional. **Exception:** Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905.

Delete without substitution:

~~**[F] 3311.3 Detailed requirements.** *Standpipes* shall be installed in accordance with the provisions of Chapter 9. **Exception:** *Standpipes* shall be either temporary or permanent in nature, and with or without a water supply, provided that such *standpipes* conform to the requirements of Section 905 as to capacity, outlets and materials.~~

2024 International Existing Building Code

SECTION 1508
MEANS OF EGRESS

Revise as follows:

[F] 1508.2 Maintenance of means of egress. Means of egress and required accessible means of egress shall be maintained at all times during construction, demolition, ~~remodeling or~~ *alterations* and *additions* to any building. **Exception:** Existing means of egress need not be maintained where *approved* temporary means of egress and accessible means of egress systems and facilities are provided.

SECTION 1509

STANDPIPES

Revise as follows:

[F] 1509.1 Where required. In buildings required to have standpipes by Section 905.3.1 of the *International Building Code*, not less than one functional standpipe for use by the fire service shall be provided for use during construction. ~~Such~~ Each functional standpipe ~~standpipes~~ shall be installed with the building as it progresses and prior to construction exceeding 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at approved locations in or adjacent to *stairways*, complying with Section 1508.1. As construction ~~progresses~~ continues to progress, ~~such~~ the standpipes shall be extended to within one floor of the highest point ~~of construction~~ having secured decking or flooring.

[F] 1509.2 Buildings being demolished. Where a building or portion of a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition ~~so as~~ to be available for use by the fire department. Such standpipe shall be demolished with the building and ~~but~~ shall not be demolished more than one floor below the floor being demolished. Where more than one standpipe exists in the building, the contractor shall coordinate with the fire code official which standpipe shall remain functional. **Exception:** Where the existing standpipe is found to be inoperable, damaged, or required to be removed as part of the site safety plan, a temporary standpipe shall be installed in accordance with Section 905 of the *International Building Code*.

Delete without substitution:

~~**[F] 1509.3 Detailed requirements.** Standpipes shall be installed in accordance with the provisions of Chapter 9 of the International Building Code. **Exception:** Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes conform to the requirements of Section 905 of the International Building Code as to capacity, outlets and materials.~~

Reason: Most of the changes in this proposal are editorial clean up, for example:

- Adding the word maintenance to vehicle access in the second sentence of section 3307.1 allows for the complete deletion of the last sentence.

- Both temporary and permanent stairways need to be approved, in section 3307.1.3.

- Section 3307.1.4 removing remodeling as it is a form of an alteration to a building.

- Section 3307.5 needed some additional clarification that as the building progresses in its vertical construction, that a minimum of one functioning standpipe needs to be available to the fire service, once the building reaches 40 feet in height above or below fire department vehicle access.

-Section 3307.5.1 added clarification that in buildings being demolished with mutliple standpipes, at least one standpipe must remain functional as demolition progresses and the contractor shall coordinate with the fire code official. The new exception was also added to this section to signify where the existing standpipe is found to be damaged , inoperable or needs to be removed, than a temporary standpipe shall be installed. Adding the exception allows for the deletion of section 3307.5.2 as it states the temporary or permanent standpipes must comply with section 905 which is in the new exception.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, the proposed changes to this section is purely editorial in nature and does not add any new requirements which would have an impact on the cost of construction.

F217-24 Part I

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal was approved based upon the proponents reason statement. (Vote 14-0)

F217-24 Part I

F217-24 Part II

PART II - IFC: [BE] 3307.1.2; IBC: 3310.1; IEBC: [BE] 1508.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes)

2024 International Fire Code

Revise as follows:

[BE] 3307.1.2 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, a permanent *stairway* or an approved temporary ~~or permanent~~ *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Building Code

Revise as follows:

3310.1 Stairways required. Where *building* construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, a permanent *stairway* or an approved temporary ~~or permanent~~ *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Existing Building Code

Revise as follows:

[BE] 1508.1 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above or below the lowest level of fire department vehicle access, a permanent stairway or an *approved* temporary ~~or permanent~~ stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

Reason: Most of the changes in this proposal are editorial clean up, for example:

- Adding the word maintenance to vehicle access in the second sentence of section 3307.1 allows for the complete deletion of the last sentence.

- Both temporary and permanent stairways need to be approved, in section 3307.1.3.

- Section 3307.1.4 removing remodeling as it is a form of an alteration to a building.

- Section 3307.5 needed some additional clarification that as the building progresses in its vertical construction, that a minimum of one functioning standpipe needs to be available to the fire service, once the building reaches 40 feet in height above or below fire department vehicle access.

-Section 3307.5.1 added clarification that in buildings being demolished with mutliple standpipes, at least one standpipe must remain functional as demolition progresses and the contractor shall coordinate with the fire code official. The new exception was also added to this section to signify where the existing standpipe is found to be damaged , inoperable or needs to be removed, than a temporary standpipe shall be installed. Adding the exception allows for the deletion of section 3307.5.2 as it states the temporary or permanent standpipes must comply with section 905 which is in the new exception.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, the proposed changes to this section is purely editorial in nature and does not add any new requirements which would have an impact on the cost of construction.

F217-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This change is not editorial as indicated in the reason statement. At this point in construction, typically only temporary stairs are provided, so permanent stairways should not be in this section. It is not clear on what an 'approved' temporary stairway is - who would be inspecting and certifying that. If the intent is to allow for some flexibility for temporary stairways, that should be clarified further. (Vote: 9-5)

F217-24 Part II

Individual Consideration Agenda

Comment 1:

IFC: [BE] 3307.1.2; IBC: 3310.1; IEBC: [BE] 1508.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, National Association of Home Builders (NAHB) (sorlowski@sbcc.codes) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

[BE] 3307.1.2 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above or exceeds one story below the lowest level of fire department vehicle access, a ~~permanent *stairway* or an approved~~ temporary or permanent *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Building Code

3310.1 Stairways required. Where *building* construction exceeds 40 feet (12 192 mm) in height above or exceeds one story below the lowest level of fire department vehicle access, a ~~permanent *stairway* or an approved~~ temporary or permanent *stairway* shall be provided. As construction progresses, such *stairway* shall be extended to within one floor of the highest point of construction having secured decking or flooring.

2024 International Existing Building Code

[BE] 1508.1 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above or exceeds one story below the lowest level of fire department vehicle access, a ~~permanent stairwayor an *approved*~~ temporary or permanent stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

Reason: Based on the feedback received from the committee in Orlando, this committee comment reverts back to the original language regarding permanent and temporary stairways, which the committee was unclear as to who would inspect and approve the temporary stairs. The other revision included in this committee comment, is decreasing the threshold from forty feet below fire department vehicle access to more than one story. During the course of creating the committee comment, a concern was raised that from a fire operations standpoint, accessing and fighting fires below grade are much more hazardous to firefighters. FCAC decided that the threshold at which a temporary or permanent stairway should be provided for work below fire department vehicle access should be more than one story below the point of vehicle access.

Cost Impact: Increase

Estimated Immediate Cost Impact:

During the course of construction, temporary or permanent stairways are required to provide a means of egress for construction workers and access to floors for first responders. Any increase in the cost of providing a temporary stairway, will be dependent on the size of the building being constructed and the number of floors. If no temporary stairways are constructed during the course of construction, there will be no increase cost to construction, as the permanent stairways would have already been baked into the overall costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

During the course of construction, temporary or permanent stairways are required to provide a means of egress for construction workers and access to floors for first responders. Any increase in the cost of providing a temporary stairway, will be dependent on the size of the building being constructed and the number of floors. If no temporary stairways are constructed during the course of construction, there will be no increase cost to construction, as the permanent stairways would have already been baked into the overall costs.

Comment (CAH2)# 95

F218-24

IFC: 3307.1.1 (New)

Proposed Change as Submitted

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net)

2024 International Fire Code

Add new text as follows:

3307.1.1 Address Identification. Construction sites shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. The address identification and location shall be in a form approved by the Fire Chief. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Reason: Chapter 33 does not have a prescriptive requirement for the address to be posted at the construction site. The requirement is identified only in the site safety plan. Although some construction sites are large and easily distinguishable, it is necessary for all construction sites to have the address posted for emergency responders.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The address posting requirement is not include in Chapter 33. This proposal brings the requirement to the Chapter, in the section reserved for fire department site access. There is no anticipated increase cost to construction, the posting would be included with the other site sign costs.

F218-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Proposal F212-24 which was approved as submitted already addresses this issue. (Vote 11-3)

F218-24

Individual Consideration Agenda

Comment 1:

IFC: 3307.1.1; IBC: SECTION 502, [F] 502.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

3307.1.1 Address Identification. ~~Construction sites~~New and *existing building* shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 ,,) high with a minimum stroke width of 1/2 inch (12.7mm). ~~The address identification and location shall be in a form approved by the Fire Chief.~~ Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other *approved* sign or means shall be used to identify the structure. Address identification shall be maintained.

2024 International Building Code

SECTION ~~502~~3303
BUILDING ADDRESS

Revise as follows:

[F] ~~502.1~~3303.1 Address identification. New and *existing buildings* shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of $^{1}/_{2}$ inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional *approved* locations to facilitate emergency response. Where access is by means of a private road and the *building* address cannot be viewed from the *public way*, a monument, pole or other *approved* sign or means shall be used to identify the *structure*. Address identification shall be maintained.

Reason: During the CAH #1 meetings there was a point of confusion when F218-24 was brought before the committee for discussion. The committee had just heard a proposal F212 which required the construction site address to be posted at the main entrance to the site and disapproved this proposal. After the hearings, it was realized that the proposal submitted by the proponent was attempting to align the prescriptive requirements for posting of the construction site with the requirements contained in the IBC in Section 502.1.

This modification takes the original proposal and adds language that is missing from the Section 502.1 of the IBC, so that both the IBC and the IFC will match. In addition, this committee comment relocates section 502.1 from the IBC and moves it to a new section in Chapter 33, so that the safety during construction provisions are located in the same chapters of both the IBC and the IFC. The provision seems misplaced in its current location under the height and area chapter in the IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Posting of the address was already required in both the IFC and the IBC. This editorial change correlates the two codes by utilizing the existing text from the IBC and replacing the IFC language with the same provision.

Comment (CAH2)# 445

Comment 2:

IFC: SECTION 3307, 3307.1.1, 505.1

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Mark Wassom, Olathe Fire Department, FCAC - IAFC-FLSS (mswassom@olatheks.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

SECTION 3307
FIRE DEPARTMENT SITE ACCESS, ADDRESS IDENTIFICATION, AND WATER SUPPLY

3307.1.4 Address Identification. Temporary or permanent address identification and street signs shall be provided as required by Section 505. ~~Construction sites shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. The address identification and location shall be in a form approved by the Fire Chief. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.~~

505.1 Address identification. New and existing buildings and construction sites shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of $^{1}/_{2}$ inch (12.7 mm). Where required by the *fire code official*, address identification shall be provided in additional *approved* locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the *public way*, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

Reason: The committee expressed in hearing #1 that this proposal was not necessary because they felt that approval of F212 addressed the need. F212 and F218 cover two different subjects, and approval of F212 does not resolve the issue that this proposal is attempting to address. F212 requires the posting of a construction site address on the emergency information sign so that workers or others on the site can provide the address in the event they need to call emergency services.

F218 would require the address of a construction site to be posted so that it is visible to the fire department and other emergency responders so they can properly identify the location during an emergency response. This is an important feature that is commonly not provided and this proposal will help to resolve that issue.

This proposal was reviewed by the Enforcement and ITM Working Group of the Fire Code Action Committee. We identified that the proposed change has similar text pertaining to address identification that is already in Section 505, however it would be important to provide a clarification that this also must apply to construction sites. We have revised the proposed new section to identify that construction sites are required to have temporary or permanent address identification, and then refer to Section 505 for the criteria. Section 505.1 has a small modification to include construction sites.

We feel that these proposed modifications uphold the original intent of this code change proposal but provide some improvements for clarity. We respectfully request that the committee reconsider this proposal and approve as modified to help to address a common challenge and improve emergency response to construction sites.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal is merely a clarification that address identification is required on construction sites for efficient emergency

response. There would not be a cost impact.

Comment (CAH2)# 183

Comment 3:

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net) requests As Submitted

Reason: During the 1st Committee Hearing in Orlando, Committee members expressed this code proposal was included in another proposal from Chapter 31. The address posting requirement is included in proposal F212-24. Proposal 212-24 identifies only the address needs to be posted, this proposal includes the prescriptive address identification requirements from Section 505.1. The proposal makes the address posting requirements for buildings and construction sites consistent, assisting the inspector when requiring the code provision.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 180

F225-24

IFC: SECTION 3313 (New), 3313.1 (New)

Proposed Change as Submitted

Proponents: James Carver, Self, Southern California Fire Prevention Officer's Association (james90245@pacbell.net); Joseph Cervantes, Space Age Electronics, Space Age Electronics (joseph.cervantes@1sae.com)

2024 International Fire Code

Add new text as follows:

SECTION 3313
TEMPORARY DETECTION AND NOTIFICATION

3313.1 General. Buildings under construction greater than 3 stories in height, where the square footage of construction is greater than 100,000 square feet, shall be provided with an approved temporary notification and detection system during construction. The system shall report to a constantly attended location and be installed in accordance with the manufacturer's instructions.

Reason: The recent tragic incident in Charlotte, North Carolina, where two construction workers lost their lives in a significant fire, underscores the urgent need to revise the International Building Code to include mandatory advanced notification and detection systems on construction sites. This proposal is driven by several critical factors:

1. Immediate Notification for Enhanced Worker Safety: In environments like construction sites, where hazards are ever-present, the danger is magnified by the risk of fire. The Charlotte incident painfully illustrates this, as workers, hindered by mandatory hearing protection and ambient noise, were unable to hear verbal fire warnings. A formalized fire detection and notification system ensures that all workers are alerted promptly, significantly decreasing the likelihood of injury or loss of life.

2. Community Safety and Rapid Emergency Response: Fires on construction sites pose a significant threat not just to workers but also to nearby communities. An effective detection system allows for quicker mobilization of emergency services, thereby preventing the spread of fire and protecting local residents.

3. Minimizing Property Damage and Economic Loss: Early fire detection plays a crucial role in limiting property damage. By reducing the extent of the damage, these systems not only save costs but also prevent delays in construction projects.

4. Adherence to Evolving Safety Standards: The integration of fire detection and notification systems aligns construction practices with global safety trends, demonstrating a commitment to the highest safety standards for workers and the community.

5. Valuable Data for Ongoing Safety Enhancements: Such systems also serve as a vital source of data on fire incidents, contributing to the continuous improvement of fire safety standards and practices in the construction industry.

In conclusion, the implementation of temporary notification and detection systems on construction sites is a necessary measure. This proposal aims to provide early fire detection and efficient notification to construction workers, addressing a critical safety gap highlighted by recent catastrophic events. This change is not merely reactive but a proactive step toward enhancing overall safety and aligning with progressive construction management standards.

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27. "Glasgow School of Art criticised over fire". 8 March 2019.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This cost impact statement is hypothetical and serves as a template. Actual figures should be derived using detailed cost analysis specific to the region, type of construction sites, and the specific technology used in the notification and detection systems.

Total Immediate Cost per construction site:

- Wireless notification and detection systems - $20,000 - $100,000
- Wired notification and detection systems - $35,000- $150,000

If through alternative means and methods, these systems are approved to replaces fire watch, the cost impact will be negative.

Estimated Immediate Cost Impact Justification (methodology and variables):

Equipment Costs: Includes the purchase of smoke sensors, heat sensors, and notification devices.

Installation Costs: Professional fees for installing and integrating the system into existing construction site infrastructure.

Training Costs: Expenses related to training site personnel in system operation and emergency response protocols.

Maintenance Costs: Initial maintenance and testing costs for the first year.

Administrative and Compliance Costs: Expenses associated with ensuring compliance with the new code, including any required certifications and inspections.

Variables include the size of the construction site, the complexity of the installation (which may vary based on site layout), and the level of technology chosen for the system.

Estimated Life Cycle Cost Impact:

Given the provided baseline cost ranges for wireless and wired notification and detection systems in the per project impact, this would be an estimated life cycle cost impact for each. Using a midpoint value within each range for the calculation to provide a balanced estimate.

Wireless Notification and Detection Systems

Initial Costs

Average Cost: $60,000 (midpoint of $20,000 - $100,000 range)

Installation Costs: Assumed at 10% of system cost = $6,000

Training Costs: $2,000

Total Initial Cost: $68,000

Operational Costs (Annually)

Maintenance: $1,500 (annual)

Energy Consumption: $300 (annual)

Total Annual Operational Cost: $1,800

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $10,000

Decommissioning Costs: $5,000

Total Long-Term Cost: $15,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,000 (annual)

Reduced Accident Costs: $20,000 (over 10 years)

Total Indirect Savings (10 years): $30,000

Total Estimated Life Cycle Cost for Wireless System (10 years):

Initial Costs: $68,000

Operational Costs (10 years): $18,000

Long-Term Costs: $15,000

Indirect Savings: -$30,000

Net Cost: $71,000

Wired Notification and Detection Systems

Initial Costs

Average Cost: $92,500 (midpoint of $35,000 - $150,000 range)

Installation Costs: Assumed at 15% of system cost = $13,875

Training Costs: $2,000

Total Initial Cost: $108,375

Operational Costs (Annually)

Maintenance: $2,000 (annual)

Energy Consumption: $400 (annual)

Total Annual Operational Cost: $2,400

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $15,000

Decommissioning Costs: $7,000

Total Long-Term Cost: $22,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,200 (annual)

Reduced Accident Costs: $25,000 (over 10 years)

Total Indirect Savings (10 years): $37,000

Total Estimated Life Cycle Cost for Wired System (10 years):

Initial Costs: $108,375

Operational Costs (10 years): $24,000

Long-Term Costs: $22,000

Indirect Savings: -$37,000

Net Cost: $117,375

These estimates are based on the provided cost ranges and average industry figures. Actual costs may vary based on specific site requirements, regional cost differences, and technology choices. Detailed, site-specific analysis is recommended for accurate budgeting.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Long-term Maintenance and Servicing: Regular checks and repairs over the system's lifespan.

Technology Upgrades: Potential costs for upgrading the system to keep up with technological advancements.

Energy Usage: Operational costs including electricity usage of the system.

Potential Insurance Premium Reductions: Reduction in insurance premiums due to improved fire safety measures, contributing to cost savings over the life cycle.

Depreciation: The decrease in the value of the equipment over time.

Variables include the anticipated lifespan of the equipment, estimated frequency of maintenance and upgrades, and expected trends in energy costs and insurance premiums.

F225-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Disapproval was based on general concerns with the technology and how it works. Additionally there was concern as to how it would work after hours. It as suggested that perhaps an appendix may be a better place to start. Also it was suggested that the devices obtain some sort of listings and for more details regarding these systems be mapped out and provided. (Vote 14-0)

F225-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 3313, 3313.1, APPENDIX Q (New), SECTION Q101 (New), Q101.1 (New), SECTION Q102 (New), Q102.1 (New), Q102.1.1 (New), Q102.1.2 (New), SECTION Q103 (New), Q103.1 (New), Q103.2 (New), Q103.3 (New), Q103.3.1 (New), Q103.3.2 (New), Q103.3.3 (New), Q103.3.4 (New), SECTION Q104 (New), Q104.1 (New), Q104.1.1 (New), Q104.1.2 (New), Q104.2 (New), Q104.3 (New), Q104.4 (New), Q104.5 (New), Q104.6 (New)

Proponents: Joseph Cervantes, Space Age Electronics, Space Age Electronics requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

SECTION 3313
TEMPORARY DETECTION AND NOTIFICATION

Delete and substitute as follows:

~~**3313.1 General.** Buildings under construction greater than 3 stories in height, where the square footage of construction is greater than~~

~~100,000 square feet, shall be provided with an approved temporary notification and detection system during construction. The system shall report to a constantly attended location and be installed in accordance with the manufacturer's instructions.~~

3313.1 General. Where Appendix Q has not been adopted, buildings under construction greater than 3 stories in height, or the square footage of construction is greater than 100,000 square feet, shall be provided with an approved temporary notification and detection system during construction. The system shall report to a constantly attended location and be installed in accordance with the manufacturer's instructions.

Add new text as follows:

APPENDIX Q
TEMPORARY NOTIFICATION AND DETECTION SYSTEM FOR CONSTRUCTION FIRE PROTECTION

SECTION Q101
GENERAL

Q101.1 General. This section addresses the application, installation, performance, and maintenance of temporary notification and detection systems designed specifically for fire protection during all construction phases, including all related components and spans the entire period from the initiation of construction activities through to their completion, when required by the fire code official as a means for emergencies reporting.

SECTION Q102
CONSTRUCTION DOCUMENTS

Q102.1 General. Construction documents for temporary notification and detection systems for construction Fire Protection shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules, and regulations, as determined by the *fire code official*.

Q102.1.1 Construction Documents. Construction documents and supporting data shall be submitted with each application for a permit and in such form and detail as required by the fire code official. The construction document submittal shall comply with all of the following:

1. Prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
2. Submitted for review and approval prior to installation.
3. Be clear, legible, and to scale
4. Each drawing shall include a title block with the project name, project number, location, preparer's name, and date.

Q102.1.2 Fire protection system shop drawings. Shop drawings for the fire protection systems shall be submitted to indicate compliance with Appendix Q, this code and the construction documents, and shall be approved prior to the start of installation. Shop drawings shall contain all the following information and as required by the referenced installation standards:

1. System Layout. Detailed layout of the system, including the locations of all components such as sensors, alarms and control units. Indicate the type and model of each device.
2. Pathway Diagram. Detailed pathway (wired or wireless) between all system components.
3. Zones and Circuits. Clear indication of zones and circuits, with identification of devices within each zone.

4. Mounting Details. Mounting height and locations for all components, and details for mounting supports and brackets.
5. Power Supply. Information on the power supply, including source, voltage, and backup power provisions.
6. Calculations and Supporting Documentation. Battery and voltage drop calculations to ensure proper operation of the system under normal and emergency conditions, as applicable. Documentation of device compatibility and manufacturer's specifications.
7. Testing and Commissioning. Outline the testing procedures to be used to verify the system's functionality, including the forms for recording test results and commissioning documentation, acceptable to the fire code official.
8. Maintenance and Operation Manuals. Provide maintenance and operation manuals for the temporary notification and detection system, including information on routine inspections, testing, and maintenance requirements, as required by the fire code official.
9. Compliance and Standards. Ensure that the design complies with relevant local and international standards, as applicable.
10. Equipment. Systems and components should be installed in accordance with the manufacturer's instructions.
11. System Use. The temporary notification and detection system should be removed upon acceptance of the permitted building fire alarm system or as required by the fire code official.

SECTION Q103
TRAINING DOCUMENTATION

Q103.1 General. This section establishes the training documentation requirements to ensure the competence and readiness of site safety directors and fire watch personnel in handling temporary detection and notification systems and applies to all construction sites, and other locations where these temporary systems are deployed.

Q103.2 Where Required. Where required by the fire code official, temporary notification and detection systems shall meet the requirements of this section.

Q103.3 Training requirements. Training shall be followed when temporary detection and notification systems are installed in accordance with Sections Q103.3.1 through Q103.3.4.

Q103.3.1 Site safety director.. The site safety director, as required in Section 3303.2 of this code, shall complete a comprehensive training program specific to temporary detection and notification systems, including, but not limited to, system installation, system operation, system troubleshooting, emergency response procedures related to these systems, and use of notification and detection equipment. Training shall be conducted by a qualified person. Initial training and routine training shall be provided.

Q103.3.2 Fire Watch Personnel.. Fire watch personnel as required in Section 3305.5.2 of this code, shall complete a specialized training program specific to temporary detection and notification systems, covering fire watch duties and responsibilities related to these systems, identification and reporting of system faults and emergency communication procedures. Training shall be conducted by a qualified person. Initial training and routine training shall be provided.

Q103.3.3 Documentation Requirements. Training for both the site safety directors and fire watch personnel shall be documented in detail. The documentation shall include all of the following information:

1. Date and time of the training.
2. Full names and roles of all attendees.
3. Type of training conducted.
4. Name and qualifications of the trainer.
5. List of training materials used.

Q103.3.4 Record keeping.. Records shall be stored in a secure, accessible location and be available to the fire code official upon request. Both physical and digital formats of records are acceptable, provided they are well-organized and protected from loss or damage.

Add new text as follows:

SECTION Q104
TEMPORARY DETECTION AND NOTIFICATION SYSTEMS

Q104.1 Where required. Where required by the fire code official, temporary notification and detection systems shall meet the requirements of this section.

Q104.1.1 New buildings and structures. All new buildings and structures undergoing construction that exceed 3 stories in height and/or encompass more than 100,000 square feet shall be equipped with an approved temporary notification and detection system. This system shall remain operational throughout the construction phase.

Q104.1.2 Renovation, retrofit, and demolition of buildings. All buildings undergoing substantial renovation, retrofit, or demolition shall have temporary detection and notification systems installed to ensure the safety of occupants and construction personnel.These temporary systems shall be designed to provide effective and reliable fire detection and notification throughout the affected construction areas.

Q104.2 Documentation and compliance. Detailed construction documents in accordance with Q102 shall be provided.

Q104.3 System design and installation. The design of temporary detection and notification systems shall include the following

1. The design of temporary detection and notification systems shall comply with this code and referenced standards, as applicable.
2. The systems shall include sensors, alarms, control units, and all necessary components to ensure proper functionality.
3. The systems shall be capable of integrating with existing fire alarm systems, where applicable.

Q104.4 Demolition safety. During the demolition of buildings, temporary detection and notification systems shall remain operational.

Q104.5 Testing and maintenance. Temporary detection and notification systems shall be initially and routinely tested, in accordance with the manufactures instructions. Training Documentation shall be provided in accordance with Section Q103.

Q104.6 System components. Temporary detection and notification systems components shall comply with all the following:

1. Control Units. Temporary notification and detection control units shall be installed in accordance with the manufacturers listed instructions.
    1.1. Alarm Activation and Annunciation. Upon activation, the temporary notification and detection system shall initiate occupant notification and shall annunciate at the control unit. After working hours, the system shall remain in operation.

2. Manual Alarms. The temporary notification and detection system shall include manual alarms. These alarms shall be accessible to construction personnel to allow for immediate activation in case of a fire or other emergency.

   2.1. Location. Not less than one manual alarm shall be provided at each required exit access of the structure.

   2.2. Protective Covers. Where provided, the installation of manual alarm protective covers to prevent malicious alarms or protection from physical damage shall be provided. The protective cover shall be transparent in color with a transparent face to permit visibility of the manual alarm.

   2.3. Unobstructed and unobscured. Manual alarms shall be provided with ready access, unobstructed, unobscured, and visible always.

3. Notification Appliances The system shall provide both audible and visual notification signals that can alert all personnel on the construction site during an emergency.

   3.1. These notifications appliances shall provide distinct audible and visual alarms.

   3.2. These appliances shall be placed throughout the construction area on the interior, a minimum of one exterior appliance in an approved location.

4. Smoke and Heat Sensors. Appropriate smoke and heat sensors shall be installed at locations to ensure prompt detection of fires. Sensor types and placements shall consider the specific hazards and layout of the construction site.

   4.1. Heat Sensors. Heat sensors shall be installed in areas prone to activities that could inadvertently activate smoke sensors. These sensors shall be appropriately rated to withstand the environmental conditions and fire risks present at the construction site.

   4.2. Smoke Sensors. Smoke sensors shall be installed in designated areas of the construction site to ensure early detection of fire incidents. These sensors shall be specifically designed and rated to endure the environmental conditions and potential fire hazards present on the construction site. Additionally, smoke sensors shall be strategically placed to avoid false activations caused by construction activities.

5. Monitoring. The temporary notification and detection system shall be monitored continuously to ensure it always remains operational. Monitoring shall be conducted by designated onsite constantly attended personnel or through a remote, approved monitoring service.

6. Interconnection. All components of the temporary notification and detection system shall be interconnected, either through wired or wireless pathways. Activation of any temporary notification and detection system alarm causing components shall activate the notification system throughout the site.

7. Power Source. The system shall be powered by a reliable, independent source, with provisions for additional backup power to maintain functionality in the event of a power failure. Both the primary and secondary power sources can be battery power.

Reason: We are resubmitting our code proposal to address the concerns raised during the previous review in CAH1, which led to the disapproval based on general concerns with the technology, its functionality, and its operation after hours. Additionally, it was suggested that an appendix might be a more appropriate starting point, and that the devices should obtain relevant listings and include more detailed system mappings.

Addressing General Concerns with the Technology and Functionality

We acknowledge the need for clarity regarding the technology and its operational mechanisms. In response, we have provided comprehensive requirements for documentation that elaborates on the technology's principles, functionalities, and benefits. This will includes detailed schematics, operational protocols, and user scenarios to illustrate its efficacy and safety.

After-Hours Operation

To address concerns about after-hours functionality, we have included additional for the system's reliability and robustness during non-operational hours. This includes backup power system requirements, automated monitoring protocols, and fail-safes to ensure continuous operation and immediate response in emergency situations.

Proposal for an Appendix

In light of the suggestion to start with an appendix, we have developed a detailed appendix outlining the technology's specifications, use cases, and integration procedures. This appendix serves as a comprehensive reference for stakeholders to understand the technology's application and benefits within the code framework.

Obtaining Listings

Companies are actively pursuing relevant listings and certifications to validate the technology's compliance with industry standards. This process includes rigorous testing and evaluation by recognized certification bodies. We anticipate these listings will be obtained shortly and will provide updates as they become available to jurisdictions who require them.

Detailed System Shop Drawings

To provide a clearer understanding of the technology, we have mapped out the system's components, interactions, and integration points. These shop drawings include diagrams, architectural layouts, and operational sequences to ensure a transparent and thorough presentation of how the system functions within various scenarios.

Conclusion

We believe that with these enhancements and additional information, our proposal now addresses the previously raised concerns and provides a clearer understanding of the technology and its benefits. We respectfully request the committee to reconsider our proposal, taking into account the supplementary modification and improvements made.

Thank you for your consideration.

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4. https://www.wbtv.com/2023/09/27/wbtv-investigates-fire-failure/?fbclid=IwAR02hx77LfYYTax5TdUs4Nrk0Ew1YBXJib5EhnCE0vkhSq6BPwEyInImqw0
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27. "Glasgow School of Art criticised over fire". 8 March 2019.
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Cost Impact: Increase

Estimated Immediate Cost Impact:

This cost impact statement is hypothetical and serves as a template. Actual figures should be derived using detailed cost analysis specific to the region, type of construction sites, and the specific technology used in the notification and detection systems.

Total Immediate Cost per construction site:

- Wireless notification and detection systems - $20,000 - $100,000
- Wired notification and detection systems - $35,000- $150,000

If through alternative means and methods, these systems are approved to replaces fire watch, the cost impact will be negative.

Estimated Immediate Cost Impact Justification (methodology and variables):

Equipment Costs: Includes the purchase of smoke sensors, heat sensors, and notification devices.

Installation Costs: Professional fees for installing and integrating the system into existing construction site infrastructure.

Training Costs: Expenses related to training site personnel in system operation and emergency response protocols.

Maintenance Costs: Initial maintenance and testing costs for the first year.

Administrative and Compliance Costs: Expenses associated with ensuring compliance with the new code, including any required certifications and inspections.

Variables include the size of the construction site, the complexity of the installation (which may vary based on site layout), and the level of technology chosen for the system.

Estimated Life Cycle Cost Impact:

Given the provided baseline cost ranges for wireless and wired notification and detection systems in the per project impact, this would be an estimated life cycle cost impact for each. Using a midpoint value within each range for the calculation to provide a balanced estimate.

Wireless Notification and Detection Systems

Initial Costs

Average Cost: $60,000 (midpoint of $20,000 - $100,000 range)

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Training Costs: $2,000

Total Initial Cost: $68,000

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Total Annual Operational Cost: $1,800

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $10,000

Decommissioning Costs: $5,000

Total Long-Term Cost: $15,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,000 (annual)

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Total Indirect Savings (10 years): $30,000

Total Estimated Life Cycle Cost for Wireless System (10 years):

Initial Costs: $68,000

Operational Costs (10 years): $18,000

Long-Term Costs: $15,000

Indirect Savings: -$30,000

Net Cost: $71,000

Wired Notification and Detection Systems

Initial Costs

Average Cost: $92,500 (midpoint of $35,000 - $150,000 range)

Installation Costs: Assumed at 15% of system cost = $13,875

Training Costs: $2,000

Total Initial Cost: $108,375

Operational Costs (Annually)

Maintenance: $2,000 (annual)

Energy Consumption: $400 (annual)

Total Annual Operational Cost: $2,400

Long-Term Costs (Over 10 Years)

System Upgrades (every 5 years): $15,000

Decommissioning Costs: $7,000

Total Long-Term Cost: $22,000

Indirect Costs and Savings

Insurance Premium Reductions: $1,200 (annual)

Reduced Accident Costs: $25,000 (over 10 years)

Total Indirect Savings (10 years): $37,000

Total Estimated Life Cycle Cost for Wired System (10 years):

Initial Costs: $108,375

Operational Costs (10 years): $24,000

Long-Term Costs: $22,000

Indirect Savings: -$37,000

Net Cost: $117,375

These estimates are based on the provided cost ranges and average industry figures. Actual costs may vary based on specific site requirements, regional cost differences, and technology choices. Detailed, site-specific analysis is recommended for accurate budgeting.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Long-term Maintenance and Servicing: Regular checks and repairs over the system's lifespan.

Technology Upgrades: Potential costs for upgrading the system to keep up with technological advancements.

Energy Usage: Operational costs including electricity usage of the system.

Potential Insurance Premium Reductions: Reduction in insurance premiums due to improved fire safety measures, contributing to cost savings over the life cycle.

Depreciation: The decrease in the value of the equipment over time.

Variables include the anticipated lifespan of the equipment, estimated frequency of maintenance and upgrades, and expected trends in energy costs and insurance premiums.

Comment (CAH2)# 655

F230-24

IFC: CHAPTER 42 (New), SECTION 4201 (New), 4201.1 (New), 4201.1.1 (New), 4201.2 (New), 4201.3 (New), SECTION 4202 (New), 4202.1 (New), SECTION 320, 320.1, 320.2, 320.3, 320.4, 320.4.1, 320.4.2, 320.4.2.1, 320.4.2.2, 320.4.2.3, 320.4.2.4, 320.4.2.5, 320.4.2.6, 320.4.3, 320.4.3.1, 320.4.3.2, 320.4.3.3, SECTION 322, 322.1, 322.1.1, 322.2, 322.3, 322.4, 322.5

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com)

2024 International Fire Code

Add new text as follows:

CHAPTER 42
BATTERIES

SECTION 4201
GENERAL

4201.1 Scope. The provisions of this chapter shall apply to research, testing, manufacturing, recycling, use or storage of the battery types defined in Chapter 2. **Exception:** Installed energy storage systems regulated by Section 1207.

4201.1.1 Hazardous Materials Applicability.. Battery types other than those types defined in Chapter 2 shall also be in compliance with Chapters 50 through 67 as applicable.

4201.2 Electrical wiring and equipment.. Electrical wiring and equipment used in connection with batteries shall be installed and maintained in accordance with this chapter, Section 603 and NFPA 70, as applicable.

4201.3 Permits.. Permits shall be required, as applicable, in accordance with Section 105.5 and 105.6.

SECTION 4202
DEFINITIONS

4202.1 Definitions.. The following terms are defined in Chapter 2.**BATTERY**
BATTERY TYPES.

Revise as follows:

SECTION ~~320~~ 4203
LITHIUM-ION AND LITHIUM METAL BATTERY STORAGE

~~**320.1**~~ **4203.1 General.** The storage of lithium-ion and lithium metal batteries shall comply with Section ~~320~~4203.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices or vehicles they are designed to power.

3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary storage of batteries during the vehicle manufacturing or repair process.

~~320.2~~ **4203.2 Permits.** Permits shall be required for an accumulation of more than 15 cubic feet (0.42 m^3) of lithium-ion and lithium metal batteries, other than batteries listed in the exceptions to Section ~~321.1~~ 4203.1, as set forth in Section 105.5.29.

~~320.3~~ **4203.3 Fire safety plan.** A fire safety plan shall be provided in accordance with Section 404. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

~~320.4~~ **4203.4 Storage requirements.** Lithium-ion and lithium metal batteries shall be stored in accordance with Section ~~320.4.1~~4203.4.1, ~~320.4.2~~4203.4.2 or ~~320.4.3~~4203.4.3, as applicable.

~~320.4.1~~ **4203.4.1 Limited indoor storage in containers.** Not more than 15 cubic feet (0.42 m^3) of lithium-ion or lithium metal batteries shall be permitted to be stored in containers in accordance with all of the following:

1. Containers shall be open top and constructed of noncombustible materials or shall be *approved* for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m^3).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from *exits* or *exit access* doors.

~~320.4.2~~ **4203.4.2 Indoor storage areas.** Indoor storage areas for lithium-ion and lithium metal batteries, other than those complying with Section ~~320.4.1~~4203.4.1, shall comply with Sections ~~320.4.2.1~~4203.4.2.1 through ~~320.4.2.6~~4203.2.6.

~~320.4.2.1~~ **4203.4.2.1 Technical opinion and report.** A technical opinion and report complying with Section 104.2.2 shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the *fire code official* and shall require the *fire code official 's* approval prior to issuance of a permit. In addition to the requirements of Section 104.2.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for *deflagration* of flammable gases released during a thermal runaway event.
2. The basis of design for an *automatic sprinkler system* or other *approved* fire suppression system. Such design basis shall reference relevant full-scale fire testing or another *approved* method of demonstrating sufficiency of the recommended design.

~~320.4.2.2~~ **4203.4.2.2 Construction requirements.** Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated *fire barriers* or *horizontal assemblies. Fire barriers* shall be constructed in accordance with Section 707 of the *International Building Code*, and *horizontal assemblies* shall be constructed in accordance with Section 711 of the *International Building Code*.

Exceptions:

1. Where battery storage is contained in one or more *approved* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure, *fire barriers* and *horizontal assemblies* are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and *approved* by the *fire code official* as sufficient to isolate a fire in packaging to the package interior, *fire barriers* and *horizontal assemblies* are not required.

~~320.4.2.3~~ **4203.4.2.3 Fire protection systems.** Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an *automatic sprinkler system* complying with Section 903.3.1.1 or an *approved* alternative fire suppression system. The system design shall be based on recommendations in the *approved* technical opinion and report required by Section ~~320.4.2.1~~4203.4.2.1.

~~320.4.2.4~~ **4203.4.2.4 Fire alarm systems.** Indoor storage areas for lithium-ion and lithium metal batteries shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection or both.

~~320.4.2.5~~ **4203.4.2.5 Explosion control.** Where the *approved* technical opinion and report required by Section ~~320.4.2.1~~4203.4.2.1 recommends explosion control, explosion control complying with Section 911 shall be provided.

~~320.4.2.6~~ **4203.4.2.6 Reduced requirements for storage of partially charged batteries.** Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with Sections ~~320.4.2.1~~ 4203.4.2.1, ~~320.4.2.2~~4203.4.2.2 and ~~320.4.2.5~~4203.4.2.5, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been *approved*.

~~320.4.3~~ **4203.4.3 Outdoor storage.** Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections ~~320.4.3.1~~ 4203.4.3.1 through ~~320.4.3.3~~4203.4.3.3.

~~320.4.3.1~~**4203.4.3.1 Distance from storage to exposures.** Outdoor storage of lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*, shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, *lot line*, public street, public alley, public way or *means of egress*, where batteries are contained in *approved,* prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.

~~320.4.3.2~~**4203.4.3.2 Storage area size limits and separation.** Outdoor storage areas for lithium-ion or lithium metal batteries, including storage beneath weather protection in accordance with Section 414.6.1 of the *International Building Code*, shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than 10 feet (3048 mm) of open space.

~~320.4.3.3~~**4203.4.3.3 Fire detection.** Outdoor storage areas for lithium-ion or lithium metal batteries, regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an *approved* automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

SECTION ~~322~~ 4204
POWERED MICROMOBILITY DEVICES

~~322.1~~**4204.1 General.** Lithium-ion and lithium metal battery *powered micromobility devices* shall be operated and maintained in accordance with this section. **Exceptions:**

1. Storage, repair and charging in residential occupancies of *powered mobility devices*, provided that such devices are for personal use by its owner.
2. Charging of a single *powered mobility device* in any occupancy by its owner.

~~322.1.1~~4204.1.1 **Prohibited locations.** The use of a residential occupancy as a business for the charging of commercially owned *powered micromobility devices* as part of a rental or sales service shall not be permitted.

~~322.2~~4204.2 **Battery chargers and equipment.** *Powered micromobility devices* shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

~~322.3~~4204.3 **Listing.** *Powered micromobility devices* shall be *listed* and *labeled* in accordance with UL 2272 or UL 2849, as applicable.

~~322.4~~4204.4 **Battery charging areas.** Where *approved*, *powered micromobility devices* shall permitted to be charged in a room or area that complies with all of the following:

1. Only *listed* devices utilizing *listed* charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.
5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and *approved* for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an *approved* fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between the location of the battery on each *powered micromobility device* during charging operations.
8. The indoor room or area shall be protected by a *fire alarm system* utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

~~322.5~~4204.5 **Fire safety plan.** A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

Reason: FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

With the growing number of sections and language addressing batteries from manufacture, R&D, storage and use in devices in the IFC it appears the time is appropriate to create a new chapter to gather the battery related language other than Section 1207 ESS. This proposal provides the initial structure of this chapter moving current Sections 320 and 322 to this chapter. The intent is that revisions made in Sections 320 and 322 would be made in this chapter as well. In addition there are other proposals adding to the requirements in the IFC on batteries. It is intended that all those new topics would be placed in this chapter as outlined below

- **Section 4201 General**
- **Section 4202 Definitions**
- **Section 4203 Lithium-Ion and Lithium Metal Research, Testing, Manufacturing and Recycling**
- **Section 4204 Lithium-Ion and Lithium Metal Battery Storage**
- **Section 4205 Battery-Powered Devices, Industrial Trucks, Equipment and Appliances (Note: Current Section 322 is proposal to expand scope to include the additional items)**
- **Section 4206 Other Battery Types**

Having a Chapter for batteries eases finding the technical language for designers, building owners/operators and code officials.

It is expected that some items from the other sections could be merged into a general requirement such as requirements for fire safety plans with the language specific to the subtopics remaining in the designated subsections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to establish a structure for moving other existing and proposed sections of the IFC related to batteries that are being heard separately into one chapter.

F230-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal was approved as it appropriately brings all the battery requirements into a single chapter. (Vote 14-0)

F230-24

Individual Consideration Agenda

Comment 1:

IFC: 4201.1

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

4201.1 Scope. The provisions of this chapter shall apply to research, testing, manufacturing, recycling, use or storage of the battery types defined in Chapter 2.

Exception: ~~Installed~~ Stationary, mobile or portable energy storage systems regulated by Section 1207.

Reason: This proposal corrects a correlation issue. Section 1207 of the fire code applies to "Stationary, mobile and portable" ESS as does NFPA 855. The modified language mirror that.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change simply correlates this new chapter and its exception with the applicability of the referenced section.

Comment 2:

IFC: CHAPTER 42, 4201.1, SECTION 4204, SECTION 4205 (New), 4205.1 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

CHAPTER 42
BATTERIES AND BATTERY POWERED EQUIPMENT AND DEVICES

4201.1 Scope. The provisions of this chapter shall apply to the following: ~~research, testing, manufacturing, recycling, use or storage of the battery types defined in Chapter 2.~~

1. The storage of lithium-ion and lithium metal batteries at research, testing, manufacturing, recycling, and other facilities.
2. The charging, use, maintenance, and repair of battery operated equipment and devices.
3. The use, operation and maintenance of portable power packs with an energy capacity of 1 kWh or greater.

Exception: ~~Installed e~~Energy storage systems regulated by Section 1207.

SECTION 4204
BATTERY POWERED EQUIPMENT AND DEVICES ~~POWERED MICROMOBILITY DEVICES~~

Add new text as follows:

SECTION 4205
PORTABLE POWER PACKS

4205.1 General. The use, operation and maintenance of portable power packs with an energy capacity of 1 kWh or greater shall comply with Section 1208.

Reason: The 4201.1 scope was revised to more closely reflect the content in this chapter.
The 4201 exception was revised to take into consideration mobile and portable ESS regulated by 1207.

The title of 4204 was revised to more closely align with the title of section 322 that is being revised by F58-24. It is assumed that the correlating committee will also move the content of that section into this chapter and delete section 322 if a new chapter 42 is adopted.

If proposal F176-24 is adopted the requirements for portable battery packs in 1208 should be moved into section 4205.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Primarily moves requirements into this new chapter.

Comment (CAH2)# 735

F231-24

IFC: CHAPTER 42 (New), SECTION 4201 (New), 4201.1 (New), 4201.2 (New), SECTION 4202 (New), 4202.1 (New), SECTION 202 (New), SECTION 4203 (New), 4203.1 (New), 4203.1.1 (New), 4203.1.2 (New), 4203.2 (New), 4203.3 (New), 4203.3.1 (New), 4203.3.2 (New), 4203.4 (New), 4203.5 (New), 4203.5.1 (New), 4203.5.2 (New), 4203.5.3 (New), SECTION 4204 (New), 4204.1 (New), 4204.2 (New), 4204.3 (New), 4204.4 (New), 903.2.2, 903.2.2.3 (New), 903.2.7, 903.2.7.4 (New), TABLE 906.1, 1103.7, 1103.7.1 (New), 1103.7.1, 1103.7.2, 1103.7.3, 1103.7.4, 1103.7.6 (New), 1103.9, 105.5.41 (New); IBC: [F] 903.2.2, 903.2.2.3 (New), [F] 903.2.7, 903.2.7.4 (New), [F] TABLE 906.1

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

2024 International Fire Code

Add new text as follows:

CHAPTER 42
PET BOARDING

SECTION 4201
GENERAL

4201.1 Scope. Occupancies containing *pet boarding* shall comply with this chapter.

4201.2 Permit. A permit shall be required for *pet boarding* as set forth in Section 105.5.

SECTION 4202
DEFINITIONS

4202.1 Definitions. The following terms are defined in Chapter 2:
PET BOARDING.

Add new definition as follows:

PET BOARDING. Use of a Group B or Group M Occupancy to house a cumulative total of 10 or more dogs or cats for more than 12 hours per day that are available for sale or housed inside of a building as a service to the dog or cat owner.

Add new text as follows:

SECTION 4203
FIRE SAFETY PRECAUTIONS

4203.1 Fire safety plan. An *approved* fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for *pet boarding*.

4203.1.1 Fire safety plan additions. In addition to the requirements of Section 404.2.2, fire safety plans for pet boarding shall include all of the following:

1. Sequence of procedures to be followed in the event of a fire.
2. Procedures for evacuating pets, including the location of any special keys or tools required to evacuate pets.
3. Items to be inspected when conducting daily safety inspections.
4. Procedures for training employees to know the locations of portable fire extinguishers and how to properly use them.
5. Procedures for maintaining proper clearances between combustibles and ignition sources in a *pet boarding* area in accordance with Section 305.
6. Procedures to ensure that there are no open flames in a *pet boarding* area.
7. Procedures to ensure that cooking and heating in a *pet boarding* area are conducted in accordance with Chapter 41.
8. Procedures to ensure that use of current taps, relocatable power taps and extension cords in a *pet boarding* area is done in a safe manner and complies with Sections 603.5 and 603.6.
9. Procedures for ensuring that trash and other combustible waste are removed from *pet boarding* areas not less than once per day.
10. Procedures for ensuring that clothes dryer vents are kept clear of lint accumulation in accordance with Section 610.1.2.
11. Procedures for maintaining a staffing plan that specifies hours of operation, minimum staffing, staff names, and staff contact information.

4203.1.2 Posting of fire safety plan. The sequence of procedures to be followed in the event of a fire shall be prominently posted next to each egress door or opening leading out of the *pet boarding* area.

4203.2 Removal of combustible waste. Trash and other combustible waste shall be removed from pet boarding areas not less than once per day.

4203.3 Staffing. Staffing for *pet boarding* shall comply with Sections 4203.3.1 and 4203.3.2.

4203.3.1 Staffing plan. A staffing plan shall be prepared and maintained that includes current hours of operation, minimum staffing, staff names, and staff contact information.

4203.3.2 Minimum staffing. At least one staff member shall be responsible for boarded pets, remaining in or immediately adjacent to pet boarding areas and awake at all times when a cumulative total of 10 or more dogs and cats are present, including overnight, for *pet boarding* in a *fire area* that is not equipped with an *automatic sprinkler system* in accordance with Section 4204.4

4203.4 Safety inspections. Safety inspections specified in the approved fire safety plan shall be conducted at least once per day. A record of such safety inspection shall be maintained on the premises to document the date and time of each inspection and shall include the name of the individual who conducted the inspection.

4203.5 Sources of ignition. Sources of ignition in *pet boarding* areas shall comply with Sections 4203.5.1 through 4203.5.3.

4203.5.1 Cooking and heating. Cooking and heating in *pet boarding* areas shall comply with Chapter 41. Heating pads used for warming animals shall be listed and labeled by a nationally recognized testing laboratory.

4203.5.2 Open flames. Open flames shall be prohibited in *pet boarding* areas.

4203.5.3 Smoking. Smoking shall be prohibited in occupancies containing a *pet boarding* area. “No Smoking” signs shall be provided in accordance with Section 310.

SECTION 4204

FIRE PROTECTION AND LIFE SAFETY SYSTEMS

4204.1 Portable fire extinguishers. Portable fire extinguishers rated 2-A:10-B:C and mounted in accordance with Section 906.9 shall be placed adjacent to each egress door or opening leading out of a *pet boarding* area, with additional extinguishers provided as necessary so that the travel distance to an extinguisher from anywhere in a *fire area* containing a *pet boarding* area does not exceed 50 feet (15240 mm).

4204.2 Smoke detection system. An automatic smoke detection system that activates occupant notification in accordance with Section 907.5 and is monitored in accordance with Section 907.6.6 shall be installed in new and existing *fire areas* containing *pet boarding*. In locations where ambient conditions are incompatible with *smoke detectors*, *heat detectors* with a response time index of 50 $(m \times s)^{1/2}$ shall be permitted. **Exception:** An automatic smoke detection system is not required in *fire areas* equipped with an *automatic sprinkler system* complying with Section 4204.4.

4204.3 Carbon monoxide detection. In addition to the requirements in Section 915, carbon monoxide detection shall be provided in new and existing *pet boarding* areas where a *carbon monoxide source* is present.

4204.4 Automatic sprinkler system. An *automatic sprinkler system* with quick-response sprinklers complying with Section 903.3.1 or a limited area *automatic sprinkler system* complying with Section 903.3.8 with quick-response sprinklers shall be installed in *fire areas* containing *pet boarding*.

Revise as follows:

903.2.2 Group B. An *automatic sprinkler system* shall be provided for Group B occupancies as required in Sections 903.2.2.1 through 903.2.2.3 ~~and 903.2.2.2~~.

Add new text as follows:

903.2.2.3 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding*.

Revise as follows:

903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where required by Sections 903.2.7.1 through 903.2.7.4 or where any~~one~~ of the following conditions exist~~s~~:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).

Add new text as follows:

903.2.7.4 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding*.

Revise as follows:

TABLE 906.1 ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

Portions of table not shown remain unchanged.

SECTION	SUBJECT
4204.1	Pet boarding

1103.7 Fire alarm systems. An *approved fire alarm system* shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through 1103.7.8~~1103.7.6~~ and provide occupant notification in accordance with Section 907.5 unless other

requirements are provided by other sections of this code. **Exception:** Occupancies with an existing, previously *approved fire alarm system*.

Add new text as follows:

1103.7.1 Group B pet boarding. An *automatic smoke detection system* shall be installed in *fire areas* containing *pet boarding* in accordance with Section 4204.2.

Revise as follows:

1103.7.2~~1103.7.1~~ Group E. A *fire alarm system* shall be installed in existing Group E occupancies in accordance with Section 907.2.3. **Exceptions:**

1. A manual *fire alarm system* is not required in a building with a maximum area of 1,000 square feet (93 m^2) that contains a single classroom and is located not closer than 50 feet (15 240 mm) from another building.
2. A manual *fire alarm system* is not required in Group E occupancies with an *occupant load* less than 50.

1103.7.3~~1103.7.2~~ Group I-1. An automatic *fire alarm system* shall be installed in existing Group I-1 facilities in accordance with Section 907.2.6.1. **Exception:** Where each sleeping room has a *means of egress* door opening directly to an exterior egress balcony that leads directly to the *exits* in accordance with Section 1021, and the building is not more than three stories in height.

1103.7.4~~1103.7.3~~ Group I-2. In Group I-2, an automatic *fire alarm system* shall be installed in accordance with Section 1105.10.

1103.7.5~~1103.7.4~~ Group I-3. An automatic and manual *fire alarm system* shall be installed in existing Group I-3 occupancies in accordance with Section 907.2.6.3.

Add new text as follows:

1103.7.6 Group M pet boarding. An *automatic smoke detection system* shall be installed in *fire areas* containing *pet boarding* in accordance with Section 4204.2.

Revise as follows:

1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing buildings where any of the conditions identified in Section 915.1.1 exist and in *pet boarding* areas as specified in Section 4204.3. Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4. **Exceptions:**

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.
2. Carbon monoxide alarms are permitted to be solely battery operated in *dwelling units* that are not served from a commercial power source.
3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

Add new text as follows:

105.5.41 Pet boarding. An operational permit is required to for *pet boarding*.

2024 International Building Code

[F] 903.2.2 Group B. An *automatic sprinkler system* shall be provided for Group B occupancies as required in Sections 903.2.2.1

and 903.2.2.2.

Add new text as follows:

903.2.2.3 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

[F] 903.2.7 Group M. An *automatic sprinkler system* shall be provided throughout buildings containing a Group M occupancy where required by Sections 903.2.7.1 through 903.2.7.4 or where any~~one~~ of the following conditions exist~~s~~:

1. A Group M *fire area* exceeds 12,000 square feet (1115 m^2).
2. A Group M *fire area* is located more than three stories above *grade plane*.
3. The combined area of all Group M *fire areas* on all floors, including any *mezzanines*, exceeds 24,000 square feet (2230 m^2).

Add new text as follows:

903.2.7.4 Pet boarding. An *automatic sprinkler system* shall be installed in *fire areas* containing *pet boarding.*

Revise as follows:

[F] TABLE 906.1 ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS IN THE INTERNATIONAL FIRE CODE
Portions of table not shown remain unchanged.

IFC SECTION	SUBJECT
4204.1	Pet boarding

Reason: Unlike past proposals related to animal housing that broadly prescribed a minimum level of safety for all animal housing facilities based on NFPA 150 (Proposals G216-07/08, F277-18, and F69-21), this proposal takes a more targeted approach that focuses exclusively on pet safety in commercial occupancies where 10 or more dogs and cats are kept overnight. The focus on dogs and cats is not meant to diminish the value of other pets. Instead, it promotes incremental progress in the code to directly respond to numerous catastrophic fire losses in facilities that boarded dogs and cats. Most notable to me is the recent loss of 75 dogs in the Ponderosa Pet Resort fire in Georgetown, Texas on September 18, 2021. This incident led several jurisdictions in central Texas to enact ordinances that improve fire protection in new and existing pet boarding facilities. The love and care that dog and cat owners offer their pets is said by many to be on a par with children or family members. In fact, it's long been known that pet owners may delay evacuation or go back into a burning building after safely evacuating to rescue a pet. Likewise, there are recorded instances of employees of pet boarding facilities and firefighters entering burning buildings for the sole purpose of rescuing pets, putting their own lives at risk in the process. With proper safety plans and built-in protection features, these acts of desperation can be avoided.

A pet owner who entrusts a dog or cat to a business offering overnight care should have a reasonable expectation of safety for the pet based on due diligence of the business and building safety laws that govern the business. Likewise, dogs and cats in pet stores awaiting a forever home should be reasonably protected from the risk of dying unattended in an after-hours fire. Accordingly, this proposal adds new administrative requirements for a fire safety plan to be developed and maintained by dog and cat boarding occupancies, expanding the base requirements in Section 404 to address unique safety considerations related to pet boarding. The recommended safety plan additions and fire protection requirements were developed after consideration of relevant content in NFPA 150 (fire extinguisher provisions are correlated with those in NFPA 150), Illinois' 225 ILCS 605 Animal Welfare Act, California Health and Safety Code 122385, and several Texas jurisdiction ordinances.

The "10 or more" threshold is believed to be a reasonable basis for achieving consensus in the 2027 edition code development process. It seems fair that a facility with a smaller number of dogs and cats would occupy a small floor area in a personal environment with closer supervision. The larger number of 10 or more cumulative dogs and cats better reflects a commercial business that should be expected to comply with minimum safety considerations. I expect that there will be recommendations to expand the scope of this proposal, perhaps to include fire protection requirements for buildings where breeders keep dogs or cats or to include other types of animals or uses. Notably, in early January, a fire in a small breeder building killed 25 puppies in Milton, WI. Nevertheless, pet breeding facilities have not been

included in this proposal, recognizing that dogs and cats in such facilities are owned by the breeder on private property, essentially no different than private party pet owners having multiple pets on their own property, who are likewise not included. I am sympathetic to additional discussion as part of the code development process, but my objective is to not let "the perfect become the enemy of the good." It is important that consensus be reached to approve some baseline for animal housing facilities as part of the 2027 code, and more controversial topics can be revisited in a later cycle if necessary to achieve that objective.

Although the value of fire sprinklers in pet boarding occupancies cannot be overstated (demonstrated as recently as December 2023, when a fire at Animal & Medical Hospital of Frisco, Texas was controlled by a single sprinkler, saving 20 pets and resulting in no human injuries), this proposal does not recommend retrofitting existing occupancies with sprinklers. A number of individuals testified in opposition to the code requiring a higher level of protection for animals than people in past code cycles, and in deference to that viewpoint, this proposal suggests a level of protection that parallels Group R-1. Although new Group R-1 Occupancies require sprinkler protection, existing Group R-1 Occupancies need only have fire alarm systems. Recognizing that boarded dogs and cats may be restrained or, even if unrestrained with a path of egress cannot be relied upon to have an evacuation response in the event of a fire, the baseline for existing occupancies should be early warning with onsite staff and rapid notification of emergency responders.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not been reviewed or endorsed by NFSA, and I am not representing NFSA on this issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Administrative requirements, such as fire safety plans, are de minimis, and are mostly providing a means to ensure that existing code requirements are complied with. There will be a cost increase associated with adding a monitored smoke alarm system to existing occupancies, perhaps in the range of $1 to $5 per square foot, and sprinkler systems to new occupancies, perhaps in the range of $1 to $2 per square foot.

Estimated Immediate Cost Impact Justification (methodology and variables):

Various Web sites suggested the quoted price ranges, which will obviously vary greatly depending on conditions associated with any specific installation. ChatGPT generally agreed with these estimates, and given that it is entirely unreasonable to ask someone to better quantify the cost impact of a proposal of this breadth, that's as good a basis as any.

F231-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: 1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing buildings where any of the conditions identified in Section 915.1.1 exist and in *pet boarding* areas as specified in Section 4204.3. Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.
Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.

2. Carbon monoxide alarms are permitted to be solely battery operated in buildings ~~*dwelling units*~~ that are not served from a commercial power source.

3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

4201.2 Operational Permit. ~~A~~ An operational permit shall be required for *pet boarding* as set forth in Section 105.5.

Committee Reason: Approval was based upon the need for these requirements. The provisions are reasonable and focus on risk. Providing these provisions will provide consistency that can be used more broadly then leaving such requirements up to local regulators and legislature. The committee felt that it is better placed within the code than within an appendix. There were two minor modifications. The first modification corrects the term from "dwelling unit" to "buildings." Dwelling unit would be too limiting for the types of occupancies this would be allowed to be applied. The second provides correlation with the permit related proposal F2-24 stating "operational permit" more specifically. (Vote 14-0)

F231-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202, 4201.1, 4201.1.1 (New)

Proponents: Jeffrey Shapiro, P.E., FSFPE, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

PET BOARDING.
Use of an ~~Group B or Group M Occupancy~~ occupancy to house a cumulative total of 10 or more dogs or cats for more than 12 hours per day that are available for sale or housed inside of a building as a service to the dog or cat owner.

4201.1 Scope. *Pet boarding* shall be conducted in Group B or Group M Occupancies that ~~containing *pet boarding* shall~~ comply with this chapter unless otherwise allowed by Section 4201.1.1.

Add new text as follows:

4201.1.1 Pet breeding. Pet breeding on property associated with a one- or two-family dwelling or agricultural use shall not be required to comply with this chapter.

Reason: During development of this chapter, concerns were raised regarding the ability of a permit applicant to justify classification of a pet boarding facility as Group S or Group F. While I didn't initially consider this to be a significant concern, I have since learned that it is more common than expected that some people view pet boarding as a "pet storage" operation, with pets being considered "property." Accordingly, with the intent of this proposal to not allow such a loophole, it is proposed to apply the provisions regardless of occupancy classification, with the exception of pet breeding operations, which were never intended to be covered by the chapter. I consider this change to simply be a clarification of intent.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The intent is simply to clarify the original intent for applicability of the chapter.

Comment (CAH2)# 774

Comment 2:

IFC: 4203.3.2

Proponents: Jeffrey Shapiro, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

4203.3.2 Minimum staffing. At least one staff member shall be responsible for boarded pets, remaining in or immediately adjacent to pet boarding areas and awake at all times when a cumulative total of 20~~10~~ or more dogs and cats are present, including overnight, for *pet boarding* in a *fire area* that is not equipped with an *automatic sprinkler system* in accordance with Section 4204.4

Reason: Although I believe that most of the requirements in the proposed chapter should be triggered at 10 or more pets being boarded, I do understand the burden on existing facilities having to provide overnight staffing in non-sprinklered facilities. This ultimately comes down to a decision of reasonable and appropriate thresholds determined by the consensus process, and in an effort to be fair and allow further discussion on this issue, I am submitting this comment to allow others to make a case for a number greater than 10 to be used in this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This relates to an operational cost and has no impact on the cost of construction.

Comment (CAH2)# 777

F245-24

IFC: 5307.1, 5307.2 (New), 5307.2, 5307.2.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

2024 International Fire Code

5307.1 General. *Compressed gases* in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55, and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

Add new text as follows:

5307.2 Asphyxiants, irritants and radioactive gases. Asphyxiant, irritant or radioactive gases used or stored in quantities exceeding 1,000 cubic feet (28 m^3) shall comply with Sections 5307.2.1 or 5307.2.2. **Exception:** Carbon dioxide systems regulated by Sections 5307.3 or 5307.4.

Revise as follows:

~~**5307.2**~~ **5307.2.1 Ventilation.** Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied. ~~**Exceptions:**~~

1. ~~A *gas detection system* complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.~~
2. ~~Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.~~

~~**5307.2.1**~~ **5307.2.2 Gas detection system.** In rooms or areas not provided with ventilation in accordance with Section ~~5307.2~~ 5307.2.1, a *gas detection system* complying with Section 916 or, where *approved*, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.

Reason: This proposal intends to resolve an unintended loophole in the code.

Currently, Section 5307 regulates asphyxiant, irritant and radioactive gases in any quantity. These gases require require either ventilation or gas detection.

Section 5307.3 regulates liquid carbon dioxide systems for beverage dispensing, but does not make any requirements until the quantity exceeds 100 pounds.

Section 5307.4 regulates carbon dioxide enrichment systems, and again does not make any requirements until the quantity exceeds 100 pounds. This provision does not limit its application to liquid or gaseous CO2; it applies to both.

Carbon dioxide is an asphyxiant gas, and in fact that characteristic was the impetus for the regulations of beverage dispensing and CO2 enrichment. The inconsistency is that when CO2 is used for something other than beverage dispensing or CO2 enrichment the threshold of regulation drops to 0. There is no justification to regulate the other gases in any quantity, when the liquid asphyxiants (CO2) are not regulated until they exceed 100 pounds. This proposal provides a similar threshold for all other gases that fall under Section 5307, the asphyxiant, irritant and radioactive gases.

A new section 5307.2 is inserted to require that when asphyxiant, irritant and radioactive gases exceed 1,000 cubic feet, they must be provided with either ventilation or gas detection. This is the same approach used for beverage dispensing. The exceptions are relocated to Section 5307.2 in both the text and the new exception.

The 1,000 cubic feet is simply an approximation of an equivalent volume. 100 pounds of CO2 is equivalent to 875 cubic feet. Nitrogen is another common asphyxiant and 100 pounds of nitrogen is approximately 1380 cubic feet. Nitrogen is available in cylinders containing about 230 cubic feet, so 4 cylinders would be below the threshold of 1,000 cubic feet.

This proposal will provide some consistency between the requirements for CO2 in beverage dispensing or CO2 enrichment and other uses of CO2 or other asphyxiants.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This proposal will decrease the cost of construction because mechanical ventilation or gas detection will not be required for rooms or areas not exceeding 1,000 cubic feet of gas. For a typical small storage room, an estimated $5,000 will be saved by not providing additional ventilation or a gas detection system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost is difficult to pinpoint because it would be based on the size of room and other variables. The estimate is based on a reasonable assumption of construction costs.

F245-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Radioactive gases are currently not defined in the IFC. More detail radioactive gases is needed. Additionally, it was requested that the threshold be lowered before there is an exemption. (Vote 12-1)

F245-24

Individual Consideration Agenda

Comment 1:

IFC: 5307.1, 5307.2, 5307.2.1, 5307.2.2

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

5307.1 General. *Compressed gases* in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55, and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

Delete without substitution:

~~**5307.2 Asphyxiants, irritants and radioactive gases.** Asphyxiant, irritant or radioactive gases used or stored in quantities exceeding~~

~~1,000 cubic feet (28 m³) shall comply with Sections 5307.2.1 or 5307.2.2.~~ **~~Exception:~~** ~~Carbon dioxide systems regulated by Sections 5307.3 or 5307.4.~~

Revise as follows:

5307.2.~~1~~ Ventilation. Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

Exceptions:

1. A gas detection system complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.
2. Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.
3. Ventilation is not required for asphyxiant and irritant gases in quantities not exceeding 800 cubic feet.

~~5307.2.2~~5307.2.1 Gas detection system. In rooms or areas not provided with ventilation in accordance with Section ~~5307.2.1~~5307.2, a *gas detection system* complying with Section 916 or, where *approved*, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.

Reason: This item was Disapproved at CAH 1. This comment revises the proposal based on comments received at CAH 1.

The current, Section 5307 regulates asphyxiant, irritant and radioactive gases in any quantity, and these gases require either ventilation or gas detection. Then Section 5307.3 specifically regulates liquid carbon dioxide systems for beverage dispensing, but those requirements do not apply until the quantity exceeds 100 pounds. Section 5307.4 also regulates carbon dioxide, but only for enrichment systems—it again has no requirements until the quantity exceeds 100 pounds. The requirements for CO2 enrichment systems apply to both liquid and gaseous CO2.

The intent of this proposal is to provide a similar threshold for asphyxiant and irritant gases that fall under Section 5307 as is applied to the CO2 systems.

The comments received at CAH 1 indicated that there were concerns regarding the inclusion of radioactive gas. Radioactive materials, including radioactive gas, are regulated by the Nuclear Regulatory Commission at a federal level. Therefore, the radioactive gases continue to require ventilation or detection at any quantity.

Exception 3 is added to Section 5307.2 indicating that asphyxiant and irritant gases exceeding 800 cubic feet must be provided with either ventilation or gas detection. This is a similar approach used for beverage dispensing and CO2 enrichment although those thresholds are 100 pounds. The original submittal contained a threshold of 1,000 cubic feet, and at CAH 1 it was stated that this threshold seemed to be too large. The threshold has been reduced to 800 cubic feet. 100 pounds of CO2 is equivalent to 875 cubic feet. Nitrogen is another common asphyxiant and 100 pounds of nitrogen is approximately 1380 cubic feet. Nitrogen is available in cylinders containing about 230 cubic feet, so 3 cylinders (690 cubic feet) would be below the threshold of 800 cubic feet.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will decrease the cost of construction because mechanical ventilation or gas detection will not be required for rooms or areas not exceeding 800 cubic feet of gas. For a typical small storage room, an estimated $5,000 will be saved by not providing additional ventilation or a gas detection system.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost is difficult to pinpoint because it would be based on the size of room and other variables. The estimate is based on a reasonable assumption of construction costs.

F247-24

IFC: 5505.2, 5504.2.3 (New), 5504.2.3.1 (New), 5504.2.3.2 (New), 5504.2.3.3 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

5505.2 Indoor use. Indoor use of *cryogenic fluids* shall comply with the material-specific provisions of Section 5501.1 and Sections 5504.2.3 through 5504.2.3.3.

Add new text as follows:

5504.2.3 Oxygen Gas Detection. An oxygen gas detection system, complying with Section 916, shall be provided in rooms or indoor areas in which cryogenic fluids are stored. The system shall be designed as follows:

1. Activates a low-level alarm upon detection of an oxygen deficient atmosphere of 19.5% oxygen.
2. Activated a high-level alarm upon detection of an oxygen deficient atmosphere of 18% oxygen.

5504.2.3.1 Low level alarm activation. Activation of the low-level gas detection system alarm shall automatically do all of the following:

1. Stop the flow of cryogenic fluid to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.
4. Transmit a supervisory signal to an approved location in accordance with NFPA 72.

5504.2.3.2 High level alarm activation. Activation of the high-level gas detection system alarm shall automatically do all of the following:

1. Stop the flow of cryogenic fluid to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible evacuation alarm both inside and outside of the oxygen deficient area, and the area in which the cryogenic containers are located.
4. Transmit an alarm signal to an approved location in accordance with NFPA 72.

5504.2.3.3 Fire alarm system connections. The oxygen gas detection system shall be connected to a fire alarm system in accordance with fire alarm equipment manufacturer's instructions and NFPA 72.

Reason: Due the high expansion ratio of cryogenic fluids, a small leak of a cryogenic fluid can easily fill up a room or space and create an oxygen deficient or enriched atmosphere. An oxygen deficient atmosphere means that there will not be a sufficient amount of oxygen for someone to survive. An oxygen enriched atmosphere creates an environment that can easily catch fire for explode due to the fact that there is too much oxygen. These new code sections provide a oxygen detection so that the occupants are made aware of the dangerous situation and can safely evacuate. This new code language is in line with existing language for liquified compressed CO2.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Many sensors cost between $20 and $100. Typically, labor costs for a sensor installation and tying into the fire alarm system are around $150.

Estimated Immediate Cost Impact Justification (methodology and variables):

The overall cost increase in minimal but that cost is really outweighed by the fact that we are providing life safety to those that are in areas that are in and around cryogenic fluids. Individuals in these areas would not know that there is a dangerous situation without this detection and notification system. Through our research, many sensors cost between $20 and $100 and labor costs for a sensor installation and tying into the fire alarm system are around $150.

F247-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The provisions were seen as appropriate but would be better addressed as use and stored. The committee would like to see the proposal revised to reflect the need to address use as well. (Vote 11-2)

F247-24

Individual Consideration Agenda

Comment 1:

IFC: 5505.2, 5504.2.3, 5504.2.3.1, 5504.2.3.2, 5504.2.3.3

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

5505.2 Indoor use. Indoor use of *cryogenic fluids* shall comply with the material-specific provisions of Section 5501.1 ~~and Sections 5504.2.3 through 5504.2.3.3~~.

~~**5504.2.3**~~ **5503.11 Oxygen Gas Detection.** An oxygen gas detection system complying with Section 916,or an oxygen depletion alarm where approved, shall be provided in rooms or indoor areas in which inert cryogenic fluids are stored or used in quantities exceeding 100 pounds (45.5 kg). The system shall be designed as follows:

~~1.~~ Activates a low-level alarm upon detection of an oxygen deficient atmosphere of 19.5% oxygen.

~~2. Activated a high-level alarm upon detection of an oxygen deficient atmosphere of 18% oxygen.~~

~~**5504.2.3.1**~~ **5503.11.1** ~~**Low level alarm**~~ **Alarm activation.** Activation of the ~~low-level~~ oxygen gas detection system alarm shall automatically do all of the following:

~~1. Stop the flow of cryogenic fluid to the piping system.~~

~~2. Activate the mechanical exhaust ventilation system.~~

~~3.~~ 1. Activate an audible and visible supervisory alarm signal at an approved location within the building.

~~4.~~ 2. Transmit a supervisory signal to an approved location in accordance with NFPA 72.

Delete without substitution:

~~**5504.2.3.2 High level alarm activation.** Activation of the high-level gas detection system alarm shall automatically do all of the following:~~

~~1. Stop the flow of cryogenic fluid to the piping system.~~

~~2. Activate the mechanical exhaust ventilation system.~~

~~3. Activate an audible and visible evacuation alarm both inside and outside of the oxygen deficient area, and the area in which the cryogenic containers are located.~~

~~4. Transmit an alarm signal to an approved location in accordance with NFPA 72.~~

~~**5504.2.3.3 Fire alarm system connections.** The oxygen gas detection system shall be connected to a fire alarm system in accordance with fire alarm equipment manufacturer's instructions and NFPA 72.~~

Reason: In response to committee comments and follow up meetings with impacted users of cryogenic fluids the following changes are suggested.

1. The language is renumbered to move the requirement up to the General section of the chapter.
2. The ability to use an oxygen depletion alarm is added.
3. The applicability is clarified to apply to "inert" cryogenic fluids.
4. The language is modified to apply to "stored or used".
5. An exceeding 100 pounds threshold was added to match the trigger currently in the fire code for CO2 applications.
6. The reference to piping systems has been removed as not all applications include piping systems and where they do exist the stopping of the flow may present practical difficulties.
7. The activation of the mechanical exhaust has been eliminated because there is no language requiring the installation of mechanical exhaust.

With the above changes the reference to a high-level alarm is no longer needed and that language has been deleted. Since the charging language points to IFC Section 916 the section relating to tying into the fire alarm system is unnecessary and has been deleted.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The installation of a gas detection system, with notification appliances will vary depending on a number of variables, including number and size of area(s) to be monitored and number of notification appliances required.

Gas Detection System: An approximate estimate for a typical installation of an oxygen gas detection system complying with these provisions is approximately $6,500.

Oxygen Depletion Alarm (Self-Contained): An approximate estimate for a typical installation of self-contained oxygen depletion alarm system is approximately $4,500.

Maintenance is required annually on gas detection systems, and typical oxygen sensors have a life-expectancy of 2-3 years. Estimated annual maintenance, including sensor replacements as needed is $300-500 per year.

Installations without existing FACP and dialer will require additional installation, operating, and maintenance expenses. Installation range from $2000 – $5,0000. Operation and maintenance $500-$1500 per year.

Estimated Immediate Cost Impact Justification (methodology and variables):

Gas Detection System: Cost estimate for a gas detection system is based on a typical installation of a single cryogenic tank supplying a single remote use. This requires a controller, (2) sensors, (2) notification appliances, battery back-up, hardwired electrical connection, and tie-in to existing FACP.

Single Channel Controller: $1,500

Direct Connect 02 sensor x 2: $1,000

Battery Backup: $300

Horn Strobe x 2: $700

Design, installation, wiring, FACP connections: $3,000

Total Install: $6500

If FACP / Communication is needed, add $2,000 - $5,000.

Oxygen Depletion Alarm: Cost estimate for a gas detection system is based on a typical installation of a single cryogenic tank supplying a single remote use. This requires a controller, (2) sensors, (2) notification appliances, battery back-up, hardwired electrical connection, and tie-in to existing FACP.

Self-Contained Oxygen Depletion Alarm:

Fixed O2 Alarms x 2: $3,000 (Range 1,600 - $4,000)

Remote Relay, FACP connection, installation: $1500

Total Install: $4,500

Comment (CAH2)# 642

F248-24

IFC: 5505.2, 5505.2 (New), 5505.2.2.1 (New), 5505.2.2.2 (New)

Proposed Change as Submitted

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Fire Code

Revise as follows:

5505.2 Indoor use. Indoor use of cryogenic fluids shall comply with the material-specific provisions of Section 5501.1.

Add new text as follows:

5505.2 Oxygen deficiency hazards. Oxygen deficiency monitoring, alarms and controls shall be in accordance with Sections 5502.2.1 and 5502.2.2.

5505.2.2.1 Atmospheric monitoring. Areas where cryogenic liquids are used and vaporization takes place shall be monitored for oxygen deficiency. When the concentration of oxygen measures 19.5% or below an audible alarm shall sound and a visual indication shall be given inside the area and immediately outside of all entrances to the area. The alarm shall be distinct from other facility alarms. Area monitors shall be permitted to be supplemented with personal monitors where necessary.

5505.2.2.2 Emergency Stop Devices. Manually operated control devices shall be provided to shut off the cryogenic fluid supply in case of emergency. These devices shall be located at each operator control station, at entrances and exits, at all locations where a human and machine interaction is expected by design, and other locations as determined by risk assessment.

Reason: On January 28, 2021, liquid nitrogen overflowed from an immersion-spiral freezer located inside the Plant 4 building at the Foundation Food Group (FFG) facility in Gainesville, GA. The release asphyxiated two employees working on the freezer immediately and continued undetected and uncontrolled for 30 to 60 minutes. Eventually, another employee noticed the freezer room had filled with a four- to five-foot-high vapor cloud and initiated an emergency response by notifying a supervisor.

During the response to this release as many as 14 other FFG employees, including members of management, traveled to the freezer room either to investigate the release or rescue the workers. Four additional FFG employees were killed by asphyxiation, and four additional people including one firefighter were seriously injured presenting asphyxiation symptoms as the result of the response. Six additional FFG employees and three additional firefighters were also treated in the emergency room for symptoms of asphyxiation but were released that day. In addition to the staggering human toll of this incident damages of roughly $1.7 million were reported by the facility.

The freezer involved in the incident was a liquid nitrogen immersion-spiral freezer operated in conjunction with “Line 4”. Liquid nitrogen was supplied to this freezer from a 13,000-gallon bulk liquid tank installed outside of the building. The freezer was subdivided from the adjacent area by four new walls. The freezer had an exhaust system which directed vaporized nitrogen gas from inside the equipment outside of the building, but the room where the freezer was located was not served by mechanical exhaust or an HVAC system.

Despite warnings from FFG’s nitrogen/equipment supplier, no atmospheric monitoring was installed or used in the area or room where the freezer was located. Manul shutoffs for the nitrogen supply were located at the bulk tanks on the opposite end of the building from the freezer. In addition, there were ten E-stop buttons designed to shut down the freezer and isolate the nitrogen supply upon activation. All ten E-stop buttons were located within the freezer room.

During its investigation the CSB concluded that had FFG installed atmospheric monitoring and an alarm system in and around the freezer room, workers would have been warned against entering the oxygen deficient atmosphere. The CSB also concluded that the placement of the E-stop buttons solely within the room containing the hazard is not a sensible design and delayed the response to this incident. The successful implementation of these devices in conjunction with effective emergency planning and response could have prevented or mitigated the fatalities and injuries that occurred during the response to this incident.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Fire Code (IFC) and determined that the IFC Chapter 55 *Cryogenic Fluids* requires inert cryogenic fluids, including nitrogen, shall comply with ANSI/CGA P-18 along with requirements for storage and use and handling. Nothing in the code would have required FFG to use atmospheric monitoring for oxygen deficiency and an associated alarm. Additionally, no guidance is given in the code regarding the appropriate location of E-stop buttons.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2021-03-I-GA-R12:

Update the International Fire Code to:

a) require the use of atmospheric monitoring with cryogenic asphyxiants in accordance with industry guidance such as is contained in CGA P-76 Hazards of Oxygen-Deficient Atmospheres and CGA P-12 Safe Handling of Cryogenic Liquids in addition to CGA P-18 Standard for Bulk Inert Gas Systems; and,

b) include guidance on the adequate safe location of manual shutoff valves and devices such as emergency push buttons used to activate remotely operated emergency isolation valves (ROEIVs) in cryogenic fluid service. At a minimum this guidance should be harmonized with the requirements of ISO 13850 Safety of machinery – Emergency stop function – Principles for design.

The language proposed is intended to satisfactorily implement this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board. (2023, December 12). *Foundation Food Group Fatal Chemical Release.* Retrieved from www.csb.gov: https://www.csb.gov/foundation-food-group-fatal-chemical-release-/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$20,000

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of equipment is estimated at $12,000 on average and labor is estimated at $8,000 on average. The cost of the freezer unit involved in the incident at FFG was nearly $900,000. Installing the equipment described in this code change proposal would represent a ~2% increase in the total cost of that project.

$12,000 (Materials) + $8,000 (Labor) = $20,000

Cost Source:

This is an analogous estimate based on information from representatives from plant management and an engineering firm.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

F248-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Generally the committee liked the intent but preferred F247-24 with revisions made during CAH#2. Additionally this proposal would need to be coordinated with healthcare occupancies needs. (Vote 11-1)

F248-24

Individual Consideration Agenda

Comment 1:

IFC: 5505.2, 5505.2.2.1, 5505.2.2.2

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Delete and substitute as follows:

~~**5505.2 Indoor use.** Indoor use of cryogenic fluids shall comply with the material-specific provisions of Section 5501.1.~~

5503.11 Liquid Nitrogen. The use and storage of liquid nitrogen shall comply with Sections 5503.11.1 and 5503.1.11.2. **Exception:** Where the maximum quantity that could be released is less than 20,000 pounds (9,072 kg).

~~**5505.2 Oxygen deficiency hazards.** Oxygen deficiency monitoring, alarms and controls shall be in accordance with Sections 5502.2.1 and 5502.2.2.~~

5503.11.1 Oxygen Gas Detection. A gas detection system complying with Section 916 shall be provided in rooms or indoor areas in which liquid nitrogen is supplied for use via remote connection, in rooms or indoor areas in which container systems storing liquid nitrogen are located, and other areas where nitrogen vapors are expected to accumulate. The system shall be designed as follows:

1. Activates a low-level alarm upon detection of an oxygen deficient atmosphere of 19.5% oxygen.
2. Activates a high-level alarm upon detection of an oxygen deficient atmosphere of 18% oxygen.

~~**5505.2.2.1 Atmospheric monitoring.** Areas where cryogenic liquids are used and vaporization takes place shall be monitored for oxygen deficiency. When the concentration of oxygen measures 19.5% or below an audible alarm shall sound and a visual indication shall be given inside the area and immediately outside of all entrances to the area. The alarm shall be distinct from other facility alarms. Area monitors shall be permitted to be supplemented with personal monitors where necessary.~~

5503.11.2 System Activation. Activation of the low-level gas detection system alarm shall automatically:

1. Stop the flow of liquid nitrogen to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.

Activation of the high-level gas detection system alarm shall automatically:

1. Stop the flow of liquid nitrogen to the piping system.

2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible evacuation alarm both inside and outside of the oxygen deficient area, and the area in which the liquid nitrogen containers are located.

Delete without substitution:

~~**5505.2.2.2 Emergency Stop Devices.** Manually operated control devices shall be provided to shut off the cryogenic fluid supply in case of emergency. These devices shall be located at each operator control station, at entrances and exits, at all locations where a human and machine interaction is expected by design, and other locations as determined by risk assessment.~~

Reason: This comment is being offered to attempt to address the concerns of the committee for F247-24 and F248-24.

The CSB worked with FCAC including Workgroup 6 and several smaller task groups following CAH #1 to draft a proposal that would satisfy the guidance provided by the committee. Unfortunately, that effort resulted in a proposal that has been modified beyond the scope of the guidance provided by the committee and is now less protective than the language approved as submitted at CAH #1. The new proposed language also does not satisfy the requirements of the CSB's recommendation to the ICC because it does nothing to improve access to emergency shutdown systems. To demonstrate the ineffective nature of equipping these systems, or the areas they are within, with air monitoring and alarms alone I refer you to the Xytex incident.

During the winter of 2017 there was a nitrogen release from a liquid nitrogen tissue preservation process at the Xytex Cryo International, Ltd. facility in Augusta, GA. The tank supplying the nitrogen to this process was 3,000 gallons (20,235 lbs.) in size. The incident resulted in the death of Richmond County Sgt. Greg Meagher, injury to an employee of Xytex, and caused symptoms of asphyxiation in three other sheriff's deputies who responded.

According to investigators, the alarm at Xytex went off a total of three times the day of the incident, once at 1:43 PM, again at 3:26 PM, and finally at 3:44 PM. This alarm did not stop the Xytex employee from entering the space to attempt to try to shutdown the equipment. This employee was incapacitated by the oxygen deficient atmosphere in the space and was rescued by Sgt. Meagher. As previously stated, the employee was seriously injured, and Sgt. Meagher died as a result of their exposure.

At the final meeting on the subject attended by the CSB, it was decided that representatives of FCAC Workgroup 6 would enter 1 of 2 comments into CDP Access both of which are geared towards smaller systems and the CSB would enter a comment on F248-24 geared towards industrial scale freezing processes.

The updated proposal for F248-24 is based on the original F247-24 and existing code language for carbon dioxide enrichment systems (5307.4).

Changes of note include:

1. Specifically referencing liquid nitrogen instead of cryogenic fluids (Every example people have referenced this code cycle, e.g. flash freezing ice cream, industrial food processing, and tissue banks, involves liquid nitrogen specifically, also the proposed requirements don't make sense for other cryogenic fluids like oxygen, hydrogen, etc.),
2. Replacing the language about the alarms with the language from 5307.4 (The original language caused problems for many involved in the task group meetings), and
3. Setting a threshold quantity of 20,000 pounds (The tissue freezing process at Xytex was slightly larger than this, and is the smallest system involved in a catastrophic release of nitrogen I am aware of.)

The facet of the original proposal requiring coordination with healthcare occupancies (Emergency Stop Devices) has been removed from the proposal and replaced with the original language of F247-24.

Had the requirements proposed been in effect and complied with, the consequences of both the Xytex and FFG incidents would have been prevented or at least mitigated.

Bibliography:

1. WRDW (Feb 5, 2017). *UPDATE | Tanks did not cause chemical leak at Xytex, investigators say*. Viewed

at https://www.wrdw.com/content/news/BREAKING-One-deputy-dead-after-incident-at-Xytex-412835443.html
2. NBC News (Feb 6, 2017). *Xytex Sperm Bank Nitrogen Mishap: Feds Probe Deputy's Death*. Viewed at https://www.nbcnews.com/news/us-news/xytex-sperm-bank-s-nitrogen-mishap-sparks-federal-investigation-n717466

Cost Impact: Increase

Estimated Immediate Cost Impact:

$20,000

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of equipment is estimated at $12,000 on average and labor is estimated at $8,000 on average. The cost of the freezer unit involved in the incident at FFG was nearly $900,000. Installing the equipment described in this code change proposal would represent a ~2% increase in the total cost of that project.

$12,000 (Materials) + $8,000 (Labor) = $20,000

Cost Source:
This is an analogous estimate based on information from representatives from plant management and an engineering firm.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 514

F249-24

IFC: SECTION 202 (New), 5601.1.3, SECTION 5609, 5609.1, APPENDIX P (New), SECTION P101 (New), P101.1 (New), P101.2 (New), P101.2.1 (New), P101.2.2 (New), P101.2.3 (New), P101.2.4 (New), P101.2.5 (New), P101.2.6 (New), P101.2.7 (New), P101.2.7.1 (New), P101.2.7.2 (New), P101.2.7.3 (New), P101.2.7.4 (New), P101.2.7.5 (New), P101.2.8 (New), P101.2.9 (New), P101.2.10 (New), P101.2.11 (New), P101.2.11.1 (New), P101.2.11.2 (New), P101.2.12 (New), P101.2.12.1 (New), P101.2.13 (New), SECTION P102 (New), P102.1 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Add new definition as follows:

FIREWORKS RETAIL SALES (FRS) STRUCTURE. A tent, membrane structure, or temporary structure that is used only for the retail display and sale or storage of consumer fireworks to the public.

Revise as follows:

5601.1.3 Fireworks. The possession, manufacture, storage, sale, handling and use of fireworks are prohibited. **Exceptions:**

1. Storage and handling of fireworks as allowed in Section 5604.
2. Manufacture, assembly and testing of fireworks as allowed in Section 5605.
3. The use of fireworks for fireworks displays as allowed in Section 5608.
4. ~~The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided that such fireworks and facilities comply with the 2006 edition of NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100–185, as applicable for consumer fireworks.~~ Retail sale of fireworks shall be permitted where approved and shall comply with the rules and limitations established by the jurisdiction.

Delete without substitution:

~~SECTION 5609~~
~~TEMPORARY STORAGE OF CONSUMER FIREWORKS~~

~~**5609.1 General.** Where the display or temporary storage of fireworks 1.4G (consumer fireworks) is allowed by Section 5601.1.3, Exception 4, such display or storage shall comply with the applicable requirements of NFPA 1124.~~

Add new text as follows:

APPENDIX P
RETAIL SALE OF CONSUMER FIREWORKS

SECTION P101
GENERAL

P101.1 Requirements. Retail display and sales of 1.4G fireworks, including related temporary storage of 1.4G fireworks, shall comply with the requirements of this section unless otherwise indicated.

P101.2 FRS sales of fireworks.. FRS sales of fireworks where allowed by applicable laws, ordinances and regulations shall comply with regulations of the U.S. Consumer Product Safety Commission as set forth in 16 CFR 1500 and 1507 and the regulations of the U.S. Department of Transportation as set forth in 49 CFR 100 to 178, including related storage and display for sale.

P101.2.1 FRS structures. . FRS Structures that are used for the retail display, and sales or temporary storage of 1.4G fireworks shall not exceed a floor area of 1000 ft2 (92.9 m2) individually, or in aggregate where the separation distance between individual FRS structures is less than the distances specified in Table P101.2.6, and shall be one of the following types of structures:

P101.2.2 Temporary use.. Temporary Tents, membrane structures and other temporary structures used as FRS structures shall be erected for a period not to exceed 30 days and shall comply with this section, Chapter 31 of this code, and the International Building Code.

P101.2.3 Construction Permit and approval.. A construction permit is required for the construction of an FRS structure as required by Section 105.6.24, or in accordance with the *International Building Code*, as applicable.

P101.2.4 Operational permits.. Operational permits are required in accordance with Sections 105.5.16 and 105.5.49.

P101.2.5 Construction documents. . Detailed plans for FRS structures and the site they are to be erected on shall be submitted to the code official for review and approval. The construction plans shall comply with this code and the International Building code as applicable and additionally include the following details:

1. Separation distances from the following site features:
   - 1.1 Public ways
   - 1.2 Buildings
   - 1.3 Other FRS structures
   - 1.4 Vehicle fuel dispensing
   - 1.5 Propane-cylinder exchange stations
   - 1.6 Flammable and combustible liquid or gas aboveground tank storage
   - 1.7 Flammable gas and flammable liquefied gas bulk aboveground storage and dispensing areas within 300 ft (91.5 m) of the FRS structure
   - 1.8 Combustible storage
   - 1.9 Permanent or temporary generators
   - 1.10 Additional fireworks storage location
2. Vehicle access and parking areas
3. Location and type of portable fire extinguishers
4. Means of egress exit discharge paths of buildings on the same site.

P101.2.6 Separation Distances. FRS structures shall be located with the minimum separation distances required by Table P101.2.6.

P101.2.6 MINIMUM SEPARATION DISTANCES

EXPOSURE	SEPARATION DISTANCE
Public Ways	20ft (6.1m)
Buildings	20ft (6.1m)
Other FRS structures	100ft (30.4 m)
Vehicle Fuel Dispensing	100ft (30.4 m)

Propane cylinder exchange stations	100ft (30.4 m)
Flammable gas and flammable liquefied gas bulk aboveground storage or dispensing areas	300ft (91.4 m)
Flammable and combustible liquid or gas aboveground tank storage	300ft (91.4 m)
Vehicle access and parking areas	20ft (6.1m)
Combustible storage	20ft (6.1m)
Generators	20ft (6.1m)
Fireworks Storage location	20ft (6.1m)

P101.2.7 Source of Ignition. Sources of ignition shall be controlled and comply with Sections P101.2.7.1 through P101.2.7.5.

P101.2.7.1 Electrical equipment and wiring. FRS structure electrical equipment and wiring shall be in accordance with NFPA 70.

P101.2.7.2 Portable Generators. Portable generators and generator fuel supplies shall be located not less than 20 ft (6.1 m) from a FRS structure or the location of additional fireworks storage.

P101.2.7.3 Cooking Equipment . Cooking equipment of any type shall not be permitted within 25 ft (7.6 m) of FRS structures or the location of additional fireworks storage.

P101.2.7.4 Covered Fuses. Consumer fireworks within reach access of the public shall be required to have covered fuses. The device shall be considered as having a covered fuse if the fireworks device is contained within a packaged arrangement, container, or wrapper that is arranged and configured such that the fuse of the fireworks device cannot be touched directly by a person handling the fireworks without the person having to puncture or tear the packaging or wrapper, unseal or break open a package or container, or otherwise damage or destroy the packaging material, wrapping, or container within which the fireworks are contained.

P101.2.7.5 No Smoking Signs. "FIREWORKS — NO SMOKING" signs complying with Section 310 shall be conspicuously posted on all four sides where required by the fire code official. Smoking shall not be permitted inside or within 25 ft (15.5 m) of the FRS structure or the location of additional fireworks storage.

P101.2.8 Sales Display . The following shall apply to the sale and display of consumer fireworks in FRS structures.:

1. FRS structure retail sales shall not allow access to the interior of the structure by the public:
2. Consumer fireworks shall be displayed in a manner that prevents the fireworks from being handled by persons other than those operating, supervising, or working in the FRS structure.
3. In FRS structures the maximum height of sales displays shall be limited to 8 ft (2.44 m).

P101.2.9 Fireworks Discharge. Fireworks shall not be discharged within three hundred feet of a FRS structure or any fireworks storage structure. Signs reading "NO FIREWORKS DISCHARGE WITHIN 300 FEET" will be in letters at least two inches high, with a principal stroke of not less than one-half inch, on a contrasting background, will be conspicuously posted on all four sides of the FRS structure and any fireworks storage structures.

P101.2.10 Portable Fire Extinguisher. Portable fire extinguishers complying with Section 906 shall be provided and placed in locations approved by the fire code official. FRS structures of less than 200 ft2 (18.6 m2) shall be required to have only one portable fire extinguisher.

P101.2.11 Means of Egress. Retail sales areas within FRS structures shall have a minimum of two egress exit paths for staff with a minimum clear with of 32in. (0.8 m) and otherwise comply with Chapter 10 of this code.

P101.2.11.1 Exit markings. Exit paths and exit doors shall be clearly indicated as approved by the *fire code official*.

P101.2.11.2 Means of egress illumination. . Means of egress shall be illuminated in accordance with Chapter 10.

P101.2.12 Security. FRS structures and storage shall be secured against unauthorized entry and safeguarded in a manner approved by the *fire code official*.

P101.2.12.1 Security management plan. The owner or owner's authorized representative shall prepare a security management plan when the FRS is not open to the public and shall be *approved* by the *fire code official*.

P101.2.13 Storage . Temporary storage associated with FRS structures shall meet the requirements of this section or shall comply with the applicable requirements of Section 5604.

SECTION P102
REFERENCED STANDARDS

P102.1 General. See Table P102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

P102.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
49 CFR 100-178 - 2015	Department of Transportation Hazardous Materials Regulation	P101.2
16 CFR 1500-2009	CPSC Hazardous Substances and Articles; Administration and Enforcement Regulations	P101.2
16 CFR 1507 - 2002	CPSC - Firework Devices	P101.2

Reason: Forty-nine out of the fifty states permit the sale of some type of consumer fireworks. Currently the 2021 and 2024 codes reference the 2006 NFPA 1124 which contains requirements for indoor sales of consumer fireworks. Later versions of NFPA 1124 no longer include any requirements due to concern that the provisions were not adequate and proper data needs to be developed to support the requirement. Regardless of whether provisions are available within codes or standards jurisdictions are looking for guidance as to how to enforce.

This proposal removes reference to the 2006 edition of NFPA 1124.

The proposal does not address indoor sales and instead is limited to outdoor sales with the use of stands. The focus is on separation, types of outdoor structures, ignition sources, security, signage, how the consumer fireworks are displayed, fire extinguisher availability and basic exit width, markings and illumination.

Due to the sensitivity of this issue it was suggested that this would be better suited for an appendix. This eliminates the need for a jurisdiction to justify removing from the body of the code during adoption.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal provides a new appendix to provide needed guidance to jurisdictions that must address consumer fireworks that are permitted within their state. It has no affect on construction costs.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: There is a gap in regulatory tools for retail firework sales. This proposal was approved as a potential way to address fire works with more updated provisions. However, as currently written the provisions only addresses outdoor retail sales. The committee encouraged comments during CAH#2 to address indoor sales without using the reference to the 2006 edition of NFPA 1124. It was suggested that the comments be broken down by topic for CAH#2. (Vote 7-6)

F249-24

Individual Consideration Agenda

Comment 1:

IFC: APPENDIX P, SECTION P101, P101.1, P101.2, P101.3 (New), P101.3.1 (New), P101.4 (New), P101.5 (New), P101.6 (New), P101.7 (New), SECTION P102 (New), P102.1 (New), P101.2.1, P101.2.2 , P101.2.3 , P101.2.4 , P101.2.5, P101.2.6, P101.2.7 , P101.2.7.1, P101.2.7.2 , P101.2.7.3 , P101.2.7.4 , P101.2.7.5 , P101.2.8 , P101.2.9, P101.2.10 , P101.2.11 , P101.2.11.1, P101.2.11.2 , P101.2.12, P101.2.12.1, P101.2.13 , SECTION P103 (New), P103.1 (New), P103.2 (New), P103.3 (New), P103.4 (New), P103.5 (New), P103.5.1 (New), P103.6 (New), P103.7 (New), P103.7.1 (New), P103.7.2 (New), P103.7.3 (New), SECTION P102, P102.1

Proponents: Robert J Davidson, Davidson Code Concepts LLC, Self (rjd@davidsoncodeconcepts.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

APPENDIX P
RETAIL SALE OF CONSUMER FIREWORKS

SECTION P101
GENERAL

P101.1 Requirements. Retail display and sales of 1.4G fireworks, including related temporary storage of 1.4G fireworks, shall comply with the requirements of this section unless otherwise indicated.

Revise as follows:

P101.2 ~~FRS s~~ Sales of consumer fireworks.. ~~FRS sales~~ Sales of consumer fireworks where allowed by applicable laws, ordinances and regulations shall comply with regulations of the U.S. Consumer Product Safety Commission as set forth in 16 CFR 1500 and 1507 and the regulations of the U.S. Department of Transportation as set forth in 49 CFR 100 to 178, including related storage and display for sale.

Add new text as follows:

P101.3 Security. Buildings.structures and storage containing consumer fireworks shall be secured against unauthorized entry and safeguarded in a manner *approved* by the *fire code official*.

P101.3.1 Security management plan.. The *owner* or *owner's* authorized representative shall prepare a security managementplan for when the buildings or structures containing consumer fireworks are not open to the public. The plan shall be submitted to the *fire code official* for review and *approval*.

P101.4 Fireworks Discharge.. Fireworks shall not be discharged within three hundred feet of a Mercantile occupancy utilized for fireworks sales, a FRS structure, or any fireworks storage structure. Signs reading "NO FIREWORKS DISCHARGE WITHIN 300 FEET" will be in letters at least two inches high, with a principal stroke of not less than one-half inch, on a contrasting background, will be conspicuously posted on all four sides of the mercantile occupancy, the FRS structure, and any fireworks storage structures.

P101.5 Fireworks storage.. Temporary storage of consumer fireworks shall meet the requirements of this section and the applicable requirements of Section 5604 of this code.

Delete without substitution:

Add new text as follows:

P101.7 Operational permits.. Operational permits are required in accordance with Sections 105.5.16 and 105.5.49 of this code.

SECTION P102
FIREWORKS RETAIL SALES (FRS)

P102.1 General. Consumer fireworks sales utilizing FRS structures shall comply with Sections P102. 2 through P102.10.2.

~~**P101.2.1**~~ **P102.2 FRS structures. .** FRS Structures that are used for the retail display, and sales or temporary storage of 1.4G fireworks shall not exceed a floor area of 1000 ft2 (92.9 m2) individually, or in aggregate where the separation distance between individual FRS structures is less than the distances specified in Table ~~P101.2.6~~ P102.6, and shall be one of the following types of structures:

~~**P101.2.2**~~ **P102.3 Temporary use..** Temporary Tents, membrane structures and other temporary structures used as FRS structures shall be erected for a period not to exceed 30 days and shall comply with this section, Chapter 31 of this code, and the International Building Code.

~~**P101.2.3**~~ **P102.4 Construction Permit and approval..** A construction permit is required for the construction of an FRS structure as required by Section 105.6.24, or in accordance with the *International Building Code*, as applicable.

Delete without substitution:

~~**P101.2.4 Operational permits..** Operational permits are required in accordance with Sections 105.5.16 and 105.5.49.~~

Revise as follows:

~~**P101.2.5**~~ **P102.5 Construction documents. .** Detailed plans for FRS structures and the site they are to be erected on shall be submitted to the code official for review and approval. The construction plans shall comply with this code and the International Building code as applicable and additionally include the following details:

1. Separation distances from the following site features:
   1.1 Public ways
   1.2 Buildings
   1.3 Other FRS structures
   1.4 Vehicle fuel dispensing
   1.5 Propane-cylinder exchange stations
   1.6 Flammable and combustible liquid or gas aboveground tank storage
   1.7 Flammable gas and flammable liquefied gas bulk aboveground storage and dispensing areas within 300 ft (91.5 m) of the FRS structure
   1.8 Combustible storage
   1.9 Permanent or temporary generators
   1.10 Additional fireworks storage location
2. Vehicle access and parking areas
3. Location and type of portable fire extinguishers
4. Means of egress exit discharge paths of buildings on the same site.

~~P101.2.6~~ **P102.6 Separation Distances.** FRS structures shall be located with the minimum separation distances required by Table ~~P101.2.6~~ P102.6.

~~P101.2.6~~ P102.6 MINIMUM SEPARATION DISTANCES

EXPOSURE	SEPARATION DISTANCE
Public Ways	20ft (6.1m)
Buildings	20ft (6.1m)
Other FRS structures	100ft (30.4 m)
Vehicle Fuel Dispensing	100ft (30.4 m)
Propane cylinder exchange stations	100ft (30.4 m)
Flammable gas and flammable liquefied gas bulk aboveground storage or dispensing areas	300ft (91.4 m)
Flammable and combustible liquid or gas aboveground tank storage	300ft (91.4 m)
Vehicle access and parking areas	20ft (6.1m)
Combustible storage	20ft (6.1m)
Generators	20ft (6.1m)
Fireworks Storage location	20ft (6.1m)

~~P101.2.7~~ **P102.7 Source of Ignition.** Sources of ignition shall be controlled and comply with Sections P101.2.7.1 P102.7.1 through ~~P101.2.7.5~~ P102.7.4.

~~P101.2.7.1~~ **P102.7.1 Electrical equipment and wiring.** FRS structure electrical equipment and wiring shall be in accordance with NFPA 70.

~~P101.2.7.2~~ **P102.7.2 Portable Generators.** Portable generators and generator fuel supplies shall be located not less than 20 ft (6.1 m) from a FRS structure or the location of additional fireworks storage.

~~P101.2.7.3~~ **P102.7.3 Cooking Equipment .** Cooking equipment of any type shall not be permitted within 25 ft (7.6 m) of FRS structures or the location of additional fireworks storage.

~~P101.2.7.4~~ **P102.7.4 Covered Fuses.** Consumer fireworks within reach access of the public shall be required to have covered fuses. The device shall be considered as having a covered fuse if the fireworks device is contained within a packaged arrangement, container, or wrapper that is arranged and configured such that the fuse of the fireworks device cannot be touched directly by a person handling the

fireworks without the person having to puncture or tear the packaging or wrapper, unseal or break open a package or container, or otherwise damage or destroy the packaging material, wrapping, or container within which the fireworks are contained.

Revise as follows:

~~**P101.2.7.5**~~ **P102.7.5 No Smoking Signs.** "FIREWORKS — NO SMOKING" signs complying with Section 310 shall be conspicuously posted on all four sides where required by the fire code official. Smoking shall not be permitted inside or within 25 ft (15.5 m) of the FRS structure or the location of additional fireworks storage.

~~**P101.2.8**~~ **P102.8 Sales Display .** The following shall apply to the sale and display of consumer fireworks in FRS structures.:

1. FRS structure retail sales shall not allow access to the interior of the structure by the public:
2. Consumer fireworks shall be displayed in a manner that prevents the fireworks from being handled by persons other than those operating, supervising, or working in the FRS structure.
3. In FRS structures the maximum height of sales displays shall be limited to 8 ft (2.44 m).

Delete without substitution:

~~**P101.2.9 Fireworks Discharge.** Fireworks shall not be discharged within three hundred feet of a FRS structure or any fireworks storage structure. Signs reading "NO FIREWORKS DISCHARGE WITHIN 300 FEET" will be in letters at least two inches high, with a principal stroke of not less than one-half inch, on a contrasting background, will be conspicuously posted on all four sides of the FRS structure and any fireworks storage structures.~~

Revise as follows:

~~**P101.2.10**~~ **P102.9 Portable Fire Extinguisher.** Portable fire extinguishers complying with Section 906 shall be provided and placed in locations approved by the fire code official. FRS structures of less than 200 ft2 (18.6 m2) shall be required to have only one portable fire extinguisher.

~~**P101.2.11**~~ **P102.10 Means of Egress.** Retail sales areas within FRS structures shall have a minimum of two egress exit paths for staff with a minimum clear with of 32in. (0.8 m) and otherwise comply with Chapter 10 of this code.

~~**P101.2.11.1**~~ **P102.10.1 Exit markings.** Exit paths and exit doors shall be clearly indicated as approved by the *fire code official*.

Revise as follows:

~~**P101.2.11.2**~~ **P102.10.2 Means of egress illumination. .** Means of egress shall be illuminated in accordance with Chapter 10.

Delete without substitution:

~~**P101.2.12 Security.** FRS structures and storage shall be secured against unauthorized entry and safeguarded in a manner approved by the *fire code official*.~~

~~**P101.2.12.1 Security management plan.** The owner or owner's authorized representative shall prepare a security management plan when the FRS is not open to the public and shall be *approved* by the *fire code official*.~~

~~**P101.2.13 Storage .** Temporary storage associated with FRS structures shall meet the requirements of this section or shall comply with the applicable requirements of Section 5604.~~

Add new text as follows:

SECTION P103
BUILDINGS CONTAINING CONSUMER FIREWORKS RETAIL SALES

P103.1 General. Occupancies used for the sale of consumer fireworks shall comply with Sections P103.1 through P103.7.3

P103.2 Quantity limitations. The floor area of the retail display and sale of consumer fireworks shall not exceed 40 percent of the available floor area of the total square footage of the building.

P103.3 Construction. Buildings shall not exceed more than one story in height.

P103.4 Multiple-Tenant buildings.. Where consumer fireworks retail sales area is located in a structure containing other tenants, the consumer fireworks retail sales area shall be separated from the other tenants by fire barriers with a minimum fire resistance rating of two hours and no openings.

P103.5 Fire protection.. An automatic sprinkler system complying with Section 903.3.1.1 shall be provided throughout the occupancy in which retail fireworks sales are conducted

P103.5.1 Design density. The required sprinkler system shall have Extra Hazard Group 1 design density or, where *approved*, the automatic sprinkler system design density shall be based upon a hazard classification determined by large-scale fire testing.

P103.6 Fire alarms.. A fire alarm system shall be provided throughout the retail sales occupancy in accordance with Section 907.

P103.7 Means of egress.. Means of egress in the retail sales occupancy shall be in accordance with Sections P103.7.1 through P103.7.3

P103.7.1 Number of exits.. The minimum number of exits provided from the consumer fireworks retail sales area shall be not less than three.

P103.7.2 Exit access travel distance. Exits provided for in consumer fireworks retail sales area shall be located so that the exit access travel distance does not exceed 75 ft. (22.9 m).

P103.7.3 Entrances. No consumer fireworks shall be displayed for sale or stored within 5 ft (1.5 m) of any entrance to the building.

SECTION ~~P102~~ P104
REFERENCED STANDARDS

~~P102.1~~ P104.1 General. See Table ~~P102.1~~ P104.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

~~P102.1~~ P104.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
49 CFR 100-178 - 2015	Department of Transportation Hazardous Materials Regulation	P101.2
16 CFR 1500-2009	CPSC Hazardous Substances and Articles; Administration and Enforcement Regulations	P101.2
16 CFR 1507 - 2002	CPSC - Firework Devices	P101.2

Reason: During the initial hearing on this proposal the committee request that FCAC bring the proposal beck with language addressing fireworks retail sales in permanent buildings. This proposal does that.

General requires that would apply to both the temporary FRS sales and the retail sales in permanent buildings were placed under P101 general requirements. The FRS Sales language is in its own Section P102, and the new language for permanent buildings is in a new Section P103.

In the new section the language addresses Quantity limitations tied to floor area; Construction limiting the building height to a single story; Multiple-tenant buildings by requiring 2-hour fire-resistance-separation from other tenants, Fire protection (suppression) by specifying sprinkler design densit; Fire alarms by requiring the occupancy to have a fire alarm system; and Means of egress addressing the number of exits, travel distance and entrances..

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal provides a new appendix to provide needed guidance to jurisdictions that must address consumer fireworks that are permitted within their state. It has no affect on construction costs.

Comment (CAH2)# 729

F251-24

IFC: 5701.6 (New)

Proposed Change as Submitted

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Fire Code

Add new text as follows:

5701.6 Process Hazard Analysis. Where flammable and combustible liquids are stored or used in excess of the maximum allowable quantity per control area specified in Table 5003.1.1(1) process hazard analyses shall be conducted to ensure reasonable protection of people and property from dangerous conditions involving flammable and combustible liquids. The process hazard analysis shall be conducted utilizing a methodology suitable for the complexity of the process and shall consider factors internal and external to the organization. Recommendations from such analyses shall be addressed in a timely manner.

Reason: On May 1, 2002, there was a fire at the Third Coast Industries petroleum products facility in Friendswood, TX. The fire began as a relatively small one of unknown origin that eventually spread all through the facilities operations for blending and packaging motor oils, hydraulic oils, and engine and other lubricants.

The fire began overnight while the facility was unattended. It was discovered in progress by the facility's security guard who determined it was too severe to fight. Firefighters arrived on scene within minutes, but had insufficient means to fight the fire. The fire burned for more than 24 hours and consumed 1.2 million gallons of combustible and flammable liquids destroying the site. One hundred nearby residents were evacuated, a school was temporarily closed, and significant environmental cleanup was necessary due to fumes and runoff.

Approximately 98 percent of the materials at Third Coast were Class IIIB combustible liquids meaning they had a flash point of 200 Deg F or greater. They also had 4,400 gallons of methanol (Class IB), 3,500 gallons of mineral spirits (Class II), and 9,500 gallons of petroleum distillate (Class IIIA) in storage tanks intermingled with their Class IIIB products and raw materials. Based on the high flash points of most of their raw materials and products, Third Coast may have underestimated the fire hazard present at their facility.

During its investigation the CSB concluded that Third Coast had not analyzed the hazards of their facility. If they had, the deficiencies in onsite water supply, fire detection and alarm equipment, and drainage and containment for combustible liquids could have been identified and addressed prior to the fire preventing the loss of the facility, the evacuation of the community, and the damage done to the environment.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Fire Code chapters on Hazardous Materials – General Provisions and Flammable and Combustible Liquids both then and again now. Nothing in the code requires process hazard analysis unless someone wants to exercise the Performance-Based Design Alternative described at 5001.3 of the IFC.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2002-03-I-TX-R3Revise the International Fire Code to address the following issues: For facilities that are not staffed around the clock, specify circumstances where automatic fire detection is needed. Narrow exemptions for Class IIIB liquids. Expand fire protection analysis requirements to include all areas of a facility where there may be flammable or combustible fire risks.

The language proposed is intended to satisfactorily implement the objectives of this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board (CSB), "Petroleum Products Facility Incident (Destruction of Facility)," 06 March 2003. [Online]. Available: https://www.csb.gov/file.aspx?DocumentId=5611. [Accessed 30 November 2023].

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$5,000

Estimated Immediate Cost Impact Justification (methodology and variables):

There are no material costs associated with this code change. The labor cost is based on 8 hours of work by an outside consultant at $500 an hour, 8 hours of work by plant management at $56 an hour, 8 hours of work by plant engineering at $48 an hour, and 4 hours of work by a plant employee at $20 an hour.

The cost can be reduced if plant personnel can conduct a PHA without the help of a consultant. The cost of conducting a PHA is directly proportional to the complexity of the process being analyzed. The process in this example represents a storage process or a simple manufacturing process.

Consultant (8 Hours x $500) + Plant Management (8 Hours x $56) + Plant Engineering (8 Hours x $48) + Plant Employee (4 Hours x $20) = $4,912 (Rounded to $5,000)

Labor Cost Source:

- Consultant – Anecdotal Based on Experience and Quote
- Plant Management – https://www.ziprecruiter.com/Salaries/Plant-Manager-Salary
- Plant Engineering – https://www.ziprecruiter.com/Salaries/Plant-Engineer-Salary
- Plant Employee - https://www.ziprecruiter.com/Salaries/Chemical-Operator-Salary

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

F251-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This was seen as too complex for smaller projects. Such a concept would be better located within Chapter 50. It should also be correlated with NFPA 30. (Vote 12-0)

F251-24

Individual Consideration Agenda

Comment 1:

IFC: 5701.6

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov) requests As Modified by Committee (AMC2)

Modify as follows:

Delete and substitute as follows:

~~**5701.6 Process Hazard Analysis.** Where flammable and combustible liquids are stored or used in excess of the maximum allowable quantity per control area specified in Table 5003.1.1(1) process hazard analyses shall be conducted to ensure reasonable protection of people and property from dangerous conditions involving flammable and combustible liquids. The process hazard analysis shall be conducted utilizing a methodology suitable for the complexity of the process and shall consider factors internal and external to the organization. Recommendations from such analyses shall be addressed in a timely manner.~~

5701.6 Hazard Analysis. A hazard analysis shall be conducted by a qualified engineer or specialist for all rooms, buildings, and structures classified in accordance with the International Building Code as Group H-2 or H-3 occupancies. The analysis shall be in accordance with Section 6.4 of NFPA 30 and made available to the fire code official upon request.

Reason:

The proposal was revised in accordance with the committee's guidance regarding correlation with NFPA 30 and the complexity of the ask for smaller projects.

For correlation with NFPA 30, the new proposed requirement requires all facilities designated as high hazard occupancies based on their use of flammable and combustible liquids to conduct a hazard analysis in accordance with NFPA 30 Section 6.4. As, IFC Chapter 57 references NFPA 30 42 times, this suggestion seems very appropriate in hindsight.

To address complexity for smaller projects, the analysis described in Section 6.4 of NFPA 30 is much more straightforward than many common PHA methods. The goals of the analysis described in Section 6.4 of NFPA 30 are also more applicable of the purpose of IFC Chapter 57. Additionally, Section 6.4 of NFPA 30 does not apply to several operations including liquids consumed as fuel and Class II and Class III in atmospheric tanks or transferred at temperatures below their flashpoints. The conditions specified as requiring the analysis to include explosion hazards also reduce the burden on smaller/less hazardous operations.

The new proposal also addresses the committee's concerns regarding the qualifications for individuals performing these analyses. The requirement that the analysis be provided to the fire code official upon request is intended to reduce the burden on fire code officials without placing the information out of their reach.

The committee's suggestion that this requirement be located in Chapter 50 is addressed in another comment to F251-24. Given the loss history, and potential future losses, flammable/combustible liquids need to be analyzed specifically to ensure an acceptable level of risk. Besides the CSB's Third Coast investigation which was referenced in the initial proposal reason statement, the more recent ITC Tank Fire incident investigation demonstrates the potential severity of hazards when facility's fail to detect and suppress fires efficiently.

Bibliography:

1. U.S. Chemical Safety and Hazard Investigation Board. (2023, July 6). *Intercontinental Terminal Company (ITC) Tank Fire*. Retrieved from https://www.csb.gov/intercontinental-terminals-company-itc-tank-fire/
2. National Fire Protection Association. (2023). *NFPA 30 Flammable and Combustible Liquids Code*. Viewed at www.nfpa.org/30

Cost Impact: Increase

Estimated Immediate Cost Impact:

$5,000

Estimated Immediate Cost Impact Justification (methodology and variables):

There are no material costs associated with this code change. The labor cost is based on 8 hours of work by an outside consultant at $500 an hour, 8 hours of work by plant management at $56 an hour, 8 hours of work by plant engineering at $48 an hour, and 4 hours of work by a plant employee at $20 an hour.
The cost can be reduced if plant personnel can conduct a PHA without the help of a consultant. The cost of conducting a PHA is directly proportional to the complexity of the process being analyzed. The process in this example represents a storage process or a simple manufacturing process.
Consultant (8 Hours x $500) + Plant Management (8 Hours x $56) + Plant Engineering (8 Hours x $48) + Plant Employee (4 Hours x $20)

= $4,912 (Rounded to $5,000)
Labor Cost Source:
Consultant – Anecdotal Based on Experience and Quote
Plant Management – https://www.ziprecruiter.com/Salaries/Plant-Manager-Salary
Plant Engineering – https://www.ziprecruiter.com/Salaries/Plant-Engineer-Salary
Plant Employee - https://www.ziprecruiter.com/Salaries/Chemical-Operator-Salary

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 512

Comment 2:

IFC: 5701.6

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Delete and substitute as follows:

~~**5701.6 Process Hazard Analysis.** Where flammable and combustible liquids are stored or used in excess of the maximum allowable quantity per control area specified in Table 5003.1.1(1) process hazard analyses shall be conducted to ensure reasonable protection of people and property from dangerous conditions involving flammable and combustible liquids. The process hazard analysis shall be conducted utilizing a methodology suitable for the complexity of the process and shall consider factors internal and external to the organization. Recommendations from such analyses shall be addressed in a timely manner.~~

5001.5.3 Process Hazard Analysis. Where required by the fire code official, an application for a permit shall include a Process Hazard Analysis (PHA). The PHA shall be conducted by a qualified engineer or specialist, acceptable to the fire code official, in accordance with Section 104.2.2.2. Results from the PHA shall be addressed prior to permit issuance.

Reason: This comment is being made in response to the committee's input that the requirements for a PHA would be better located in Chapter 50. The application of the requirements to smaller projects and the qualifications of individuals performing the PHA's are also addressed in the new proposal.

The new proposal places the requirements in the Permits Section of Chapter 50 (5001.5). It also leaves the determination of the need for a PHA to the fire code official and establishes the qualifications of the individuals performing the analysis using existing code language from Chapter 1.

The correlation of this proposal with NFPA 30 was addressed in a previous comment. Flammable and combustible liquids have specific industry recognized analysis requirements in other codes which should be followed. Flammable and combustible liquid specific requirements are best located in IFC Chapter 57.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$5,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

There are no material costs associated with this code change. The labor cost is based on 8 hours of work by an outside consultant at $500 an hour, 8 hours of work by plant management at $56 an hour, 8 hours of work by plant engineering at $48 an hour, and 4 hours of work by a plant employee at $20 an hour.
The cost can be reduced if plant personnel can conduct a PHA without the help of a consultant. The cost of conducting a PHA is directly proportional to the complexity of the process being analyzed. The process in this example represents a storage process or a simple manufacturing process.
Consultant (8 Hours x $500) + Plant Management (8 Hours x $56) + Plant Engineering (8 Hours x $48) + Plant Employee (4 Hours x $20) = $4,912 (Rounded to $5,000)
Labor Cost Source:
Consultant – Anecdotal Based on Experience and Quote
Plant Management – https://www.ziprecruiter.com/Salaries/Plant-Manager-Salary
Plant Engineering – https://www.ziprecruiter.com/Salaries/Plant-Engineer-Salary
Plant Employee - https://www.ziprecruiter.com/Salaries/Chemical-Operator-Salary

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 513

F253-24

IFC: 5704.2.13.1.4, 5704.2.14, 5704.2.14.1, 5704.2.14.2

Proposed Change as Submitted

Proponents: Daniel Carroll, NYS, NYS DOS (daniel.carroll@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov)

2024 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~ The entire contents of the tank and related piping shall be emptied, and the tank purged of all vapor. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled completely with an *approved* inert solid material.
3. ~~The tank~~ Tanks shall be filled completely with an *approved* inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the fill pipe shall be filled completely with an *approved* inert solid material.

5704.2.14 Removal and disposal of tanks. Removal and disposal of tanks shall comply with Sections 5704.2.14.1 and 5704.2.14.2.

Revise as follows:

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. ~~*Flammable* and *combustible liquids* shall be removed from the tank and connected piping.~~ The entire contents of the tank and related piping shall be emptied, purged of all vapor, and inerted.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground. ~~**Exception**~~ **Exceptions:**
    1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
    2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved* by the *fire code official*.

4. Tank openings shall be capped or plugged, leaving a $^{1}/_{8}$-inch to $^{1}/_{4}$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall either be permanently removed or filled completely with an *approved* inert solid material.

.

Exception: Piping associated with bulk plants, terminal facilities and refineries.

5704.2.14.2 Disposal. ~~Tanks shall be disposed of in accordance with federal, state and local regulations.~~
The tank and related piping, and the contents of the tank and related piping shall be removed from the premises and disposed of in accordance with applicable local, state, or federal rules and regulations

Reason: This change provides some additional clarity on the proper removal and disposal of the materials within tanks that are abandoned in place and those removed and disposed of. It also attempts to clarify scenarios where either reuse of existing piping is necessary for replacement tank installations, or for when removal of all piping would be unnecessarily onerous.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes provide some more flexibility in the abandonment and removal of tanks while clarifying what would already be required by local,

state, and federal laws.

F253-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There was concern that it is unclear what an "approved inert solid materials" means. It was noted that term is currently used in item 3. It was also suggested that this may be better addressed with reference to environmental regulations. The new exception in Section 5704.2.14.1 was seen as useful as it requires approval of the piping which does not always occur. (Vote 11-2)

F253-24

Individual Consideration Agenda

Comment 1:

IFC: 5704.2.13.1.4, 5704.2.14.1, 5704.2.14.2

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. The entire contents of the tank and related piping shall be emptied~~, and the tank purged of all vapor~~. The contents of the storage tank and related piping shall be removed from the premises or property and disposed of in accordance with applicable local, state, or federal rules and regulations.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected and either be permanently removed, capped, plugged, or filled completely with an *approved* inert solid material.
3. Tanks shall be filled completely with an *approved* inert solid material and purged of all vapor.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed, or the fill pipe shall be filled completely with an *approved* inert solid material.

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. The entire contents of the tank and related piping shall be ~~emptied, purged of all vapor, and inerted~~ removed.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground. **Exceptions:**
    1. Piping is allowed to be abandoned in place where the *fire code official* determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the *fire code official*.
    2. Piping that is reused for the installation of a new tank and meets the applicable requirements for the new installation shall be allowed to remain where *approved* by the *fire code official*.
4. Tank openings shall be capped or plugged, leaving a $^{1}/_{8}$-inch to $^{1}/_{4}$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks and related piping shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall either be permanently removed or filled completely with an *approved* inert solid material. **Exception:** Piping associated with bulk plants, terminal facilities and refineries.

5704.2.14.2 Disposal. The tank and related piping, and the contents of the tank and related piping, shall be removed from the premises and disposed of in accordance with applicable federal ~~local~~, state, or local ~~federal~~ rules and regulations.

Reason: This proposal was modified based on the committee's suggestions and concerns. See below for a discussion of each section and the modifications therein.

Section 5704.2.13.1.4: Since filling the tank with an inert, solid material will naturally purge the tank of vapor once it is full, this provision has been moved from item #1 to item #3. Without this provision, item #1 is similar to the 2024 code, apart from the addition of a reference to disposal in accordance with federal/state/local regulations, in accordance with the suggestion of the committee at CAH1. Use of the term "inert, solid material" as added to item #2 in the original proposal is left unchanged, since this term exists in item #3 in the 2024 code, and has been present in the code since at least the 2000 edition of the IFC.

Section 5704.2.14.1: Since the existing item #5 already requires tanks to be inerted and purged of all vapor, adding this requirement to item #1 was redundant, and is removed in this modification. "Related piping" has been added to item #5 to include piping in the requirements as was done in item #1 in the original proposal.

Section 5704.2.14.2: The original proposal modified this section to include piping in the disposal requirements. This modification to the proposal makes editorial changes to this section to bring it closer to the original language in the ordering of federal, state, and local regulations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification is editorial in nature. Provisions are not removed or added, simply moved around in the section language for clarity, simplicity, and to avoid redundancy.

Comment (CAH2)# 526

F260-24

IFC: 5705.5, 5705.5.2 (New), TABLE 5705.5.2 (New), TABLE 5003.1.1(5); IBC: TABLE 307.1.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Fire Code

Revise as follows:

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:
   6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.
   6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
      6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
      6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
      6.2.3. An object placed within the activation zone and left in place will cause only one activation.
7. Storage ~~and use~~ of alcohol-based hand rub ~~rubs~~ solution not in use shall be in accordance with Section 5705.5.2 ~~the applicable provisions of Sections 5704 and 5705~~.
8. Dispensers located in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

Add new text as follows:

5705.5.2 Storage of alcohol-based hand rub solutions classified as Class I or II liquids.. The indoor storage of alcohol-based hand rub solution, classified as Class I or II liquids flammable or combustible, shall be in accordance with all of the following: **Exception:** Alcohol-based hand rub dispensers for personal use with an aggregate of not more than 16 oz (474 ml) at a workstation shall not be

included in determining the MAQ.

1. The maximum capacity of individual alcohol-based hand rub solution storage containers shall be 1 gallon (4 L) and the container shall be constructed of a material compatible with the alcohol-based solution.
2. Storage of alcohol-based hand rub solutions in basements or below grade shall be protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

TABLE 5705.5.2 MAXIMUM ALLOWABLE QUANTITY OF ALCOHOL-BASED HAND RUB SOLUTION IN STORAGEe

STORAGE LOCATION	SPRINKLERED	NONSPRINKLERED
Open storage areas[c]	60 Gal	30 Gal
Non-dedicated storage room[a]	120 Gal	60 Gal
Non-dedicated storage room; 1-HR fire separation[a,d]	240 Gal	120 Gal
Non-dedicated storage room; 2-HR fire separation[a,d]	360 Gal	240 Gal
Dedicated storage room[b]	360 Gal	240 Gal
Dedicated storage room; 1-HR fire separation[b,d]	600 Gal	240 Gal
Dedicated storage room; 2-HR fire separation[b,d]	720 Gal	240 Gal

a. Non-dedicated storage room is an enclosed storage room complying with the applicable storage requirements of this code.

b. Dedicated storage room is an enclosed storage room used only for the storage of alcohol-based hand rub solution.

c. The number of open storage areas is limited to 1 per story or fire area with a maximum, of 4 per building.

d. Fire separation shall be fire resistance-rated construction separating the dedicated storage room from the remainder of the building.

e. The maximum allowable quantity is for per control area, or smoke compartment in health care facilities.

Revise as follows:

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited.
		To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.

		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or 1-hour horizontal assemblies, or both, constructed in accordance with the *International Building Code*.
		The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents.
		The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited.
		To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited.
		To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

2024 International Building Code

Revise as follows:

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.

	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents.
		<u>The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2 of the *International Fire Code.*</u>
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

Reason: The main purpose of this proposal is to add a new Section (5705.5.2) for storage requirements and quantity limitations. This new section adds reasonable storage quantity limits and requirements based on experience over the past 4 years of the pandemic.

Two key points to consider.1. Alcohol-based hand-sanitizer solutions at the 60 - 95% level recommended by CDC are classified as Class IB based on flashpoint. However, alcohol type polar solvents have other characteristics that differentiate them from the more volatile petroleum-based flammable (ignitable) liquids: quick evaporation, water-soluble, respond well to water based automatic fire sprinklers. 2. The proposed storage quantity allowances are for ABHR replacement solution stored in their factory containers intended for replacement qualities of one dispenser can be compared to MAQs permitted for Class IB flammable liquids in Group M Occupancies for wholesale and retail sales uses (Table5704.3.4.1) need to explain this comparison; the values don't match. The proposal addresses storage of alcohol-based rub solutions in a maximum individual container size of 1 gallon; provides maximum storage quantities for sprinklered and nonsprinklered buildings and incorporates allowances for higher storage quantities based on whether the storage room is for only alcohol-based sanitizer solutions and whether the storage room has 1 or 2 hour fire resistance rated construction for compartmentation of the hazard. The current MAQs for Class IB flammable liquids (typical classification for an alcohol-based hand rub solutions) is 120 gallons with 100% increase for sprinklers and approved storage cabinets). The quantities in Table 5705.5.2 are modeled after these MAQ allowances recognizing: the storage challenges created during the pandemic and the experience of storage in these amounts without unreasonable fire risk or notable fire incidents; the benefit of fire sprinkler protection and fire separations for hazard mitigation for ABHR solution in storage.

This proposal is submitted by the ICC Fire Code Action Committee (FCAC), ICC Committee for Healthcare (CHC) and the Pandemic Task Force Code Development Work Group (PTF CDWG).

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Storage of ABHR solution is not mandated by this code requirement, but the storage of large quantities of ABHR may necessitate the construction of separated storage room (fire resistance-rated construction) or the installation of an automatic fire sprinkler system. In those instances there could be a cost for construction for new buildings or a cost of construction to renovate an existing building. However, these requirements provide an increase in amounts of hazardous materials thus further avoiding classification as a Group H occupancy.

F260-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal sets reasonable storage amounts for ABHR with associated necessary protection. (Vote 11-0)

F260-24

Individual Consideration Agenda

Comment 1:

IFC: 5705.5, 5705.5.2, 5705.5.2.1 (New), 5705.5.2.2 (New), TABLE 5705.5.2, TABLE 5003.1.1(5); IBC: TABLE 307.1.1

Proponents: Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Hoyt Jeter, City of Tacoma, City of Tacoma (hjeter@cityoftacoma.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.

6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated “touch free” alcohol-based hand-rub dispensing devices with the following requirements:

   6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer’s care and use instructions.

   6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:

      6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.

      6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).

      6.2.3. An object placed within the activation zone and left in place will cause only one activation.

7. Storage of alcohol-based hand rub solution not in use shall be in accordance with Section 5705.5.2 .

8. Dispensers located in occupancies with carpeted floors shall only be allowed in *smoke compartments* or *fire areas* equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.2 Storage of alcohol-based hand rub solutions classified as Class I or II liquids.. The maximum allowable quantity (MAQ) of alcohol-based hand rub solution stored inside shall be determined in accordance with Table 5705.5.2. ~~The indoor storage of alcohol-based hand rub solution, classified as Class I or II liquids flammable or combustible, shall be in accordance with all of the following:~~

~~**Exception:** Alcohol-based hand rub dispensers for personal use with an aggregate of not more than 16 oz (474 ml) at a workstation shall not be included in determining the MAQ.~~

~~1. The maximum capacity of individual alcohol-based hand rub solution storage containers shall be 1 gallon (4 L) and the container shall be constructed of a material compatible with the alcohol-based solution.~~

~~2. Storage of alcohol-based hand rub solutions in basements or below grade shall be protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

Add new text as follows:

5705.5.2.1 Alcohol-based hand rub solutions classified as Class I or II liquids for personal use. Dispensers for personal use with an aggregate of not more than 16 oz at a workstation shall not be included in determining the MAQ. The maximum capacity of individual alcohol-based hand rub solution storage containers shall be 1 gallon and the container shall be constructed of a material compatible with the alcohol-based solution.

5705.5.2.2 Storage in basements or below grade. Storage of alcohol-based hand rub solutions in basements or below grade shall be protected throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

TABLE 5705.5.2 MAXIMUM ALLOWABLE QUANTITY OF ALCOHOL-BASED HAND RUB SOLUTION IN STORAGEe

STORAGE LOCATION	SPRINKLERED	NONSPRINKLERED
Open storage areas[c]	60 Gal	30 Gal
Non-dedicated storage room[a]	120 Gal	60 Gal
Non-dedicated storage room; 1-HR fire separation[a,d]	240 Gal	120 Gal
Non-dedicated storage room; 2-HR fire separation[a,d]	360 Gal	240 Gal
Dedicated storage room[b]	360 Gal	240 Gal
Dedicated storage room; 1-HR fire separation[b,d]	600 Gal	240 Gal
Dedicated storage room; 2-HR fire separation[b,d]	720 Gal	240 Gal

a. Non-dedicated storage room is an enclosed storage room complying with the applicable storage requirements of this code.

b. Dedicated storage room is an enclosed storage room used only for the storage of alcohol-based hand rub solution.

c. The number of open storage areas is limited to 1 per story or fire area with a maximum, of 4 per building.

d. Fire separation shall be fire resistance-rated construction separating the dedicated storage room from the remainder of the building.

e. The maximum allowable quantity is for per control area, or smoke compartment in health care facilities.

TABLE 5003.1.1(5) HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited. The quantity of alcoholic beverages in distilling or brewing of beverages is not limited. The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited. The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or 1-hour horizontal assemblies, or both, constructed in accordance with the *International Building Code*. The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited. The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited. The quantity of liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents. The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.

Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited.
		To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

2024 International Building Code

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers constructed in accordance with Section 707 or 1-hour horizontal assemblies constructed in accordance with Section 711, or both
		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.

	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents. The quantity of alcohol-based hand rubs classified as Class I or II liquids in storage in accordance with Section 5705.5.2 of the *International Fire Code.*
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited. The quantity of hazardous materials in stationary fuel cell power systems is not limited. The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

Reason: As it's currently written and approved as submitted, the charging language in new section 5705.5.2 contains exceptions, but does not reference any tables as intended. We feel that this could be rewritten so that it's organized making it more clear.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is more of a clarification to the original proposal and does not increase or decrease beyond what was stated in the original proposed language.

Comment (CAH2)# 337

F264-24

IFC: 6104.3.2, 6104.3.3 (New)

Proposed Change as Submitted

Proponents: Gregory Wilson, Federal Emergency Management Agency, FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, RCQuinn Consulting, Inc., FEMA Building Science (rebecca@rcquinnconsulting.com)

2024 International Fire Code

6104.3.2 Special hazards. LP-gas containers shall be located with respect to special hazards including, but not limited to, above-ground *flammable* or *combustible liquid* tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in Section 6.5.3 of NFPA 58.

Add new text as follows:

6104.3.3 Flood hazard areas. LP-gas containers located in *flood hazard areas* established in Section 1612.3 of the *International Building Code* shall be located and installed in accordance with ASCE 24.

Reason: Section 6104.3.2 requires location of LP-gas containers “with respect to flooding” but does not provide specifics on what that means. This proposal adds a pointer on the minimum I-Code requirements for LP-gas containers located in flood hazard areas. The proposed change is not a new requirement; it is simply adding a reference to existing requirements for utilities and equipment in flood hazard areas.

Bibliography: *Flood Resistant Design and Construction,* ASCE/SEI 24-14

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the initial construction costs or life-cycle costs because it does not change any requirements; it only points to existing requirements for development in flood hazard areas.

F264-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: Provides a specific pointer to existing requirements on flood hazard protection for LP-gas containers. Whether or not NFPA 58 addresses this would still be beneficial. The committee verified ASCE 24 is not referenced in NFPA 58.(Vote 10-3)

F264-24

Individual Consideration Agenda

Comment 1:

Proponents: Bruce Swiecicki, National Propane Gas Association, National Propane Gas Association (bswiecicki@npga.org) requests Disapproved

Reason: F264 is adding a requirement to the fire code that would specify that in certain flood hazard areas, propane containers must either be installed underground or on elevated platforms such that the container is located above the flood elevation. This proposal was submitted without any supporting data indicating that propane containers have caused destruction, injuries or loss of life in flood events that have taken place.

Currently, the Building Code requires that buildings and other structures located in flood hazard areas be designed and constructed to withstand the effects of flooding. That is where the requirement should reside because the fire code official should not be placed in the position of having to approve specially designed structures for propane containers. It is also important to note that the requirements in Section 1612 of the Building Code (which presumably the proponent is referring to) apply only to new buildings or those that have undergone "substantial improvement," which is defined as improvements exceeding 50% of the market value of the structure. Therefore, the proposal in F264 would exceed those limitations and could very well lead to unwarranted retrofits of existing installations at extremely high costs to do so. Note that the proponent indicates that there are no increases to the cost of construction to comply with ASCE 24. This is totally untrue! The information below provides substantial costs to comply with ASCE 24. Keep in mind that there was no data submitted that would compare the benefits received to these costs, which involve either installing a container underground or on a platform above the flood elevation.

Standard above ground installations range in the low hundreds $300-800 depending on the amount of piping installed. Underground tank installation is generally in the range of $8,000-10,000 including the tank. Because the tank is underground most consumers have to shoulder the full cost as a lease option would require the customer pay for the excavation and removal should they change providers or stop using propane. Even containers installed underground may not comply with ASCE 24 if the topsoil can be washed away by hydrodynamic forces, which the standard says must be considered. Therefore, the only option might be to install the container on an elevated platform.

The construction of a platform structure suitable for the installation of both the container and product weight would cost substantially more money, probably in the range of $20,000. Since many tanks in storm prone area are also used for back up power these tanks must be larger capacity (500-1000 gallons). All fittings reside on the top of a container for both filling and shut-down. Elevation of containers creates an unsafe condition related to walking and working surfaces, accessibility, valve closure in an emergency situation, fire department access, and vapor dispersion. Since intentional work will be performed at elevation, a step, railing, platform, and guardrail assembly would be required for compliance with OSHA requirements for elevated structures.

Since adequately anchored containers are resistant to movement in flooding of even storm surge, there is no functional requirement for them to be above water at all times. A propane tank and piping is a closed system no different from a natural gas pipeline. A tank is completely functional below water with no deleterious effects as a pipeline would be. The only impact in high water is that the container can not be refilled when under water. This would be the exact same restriction however if the tank was on an elevated platform. If the water was at such a height that it was impacting the platform a person would not fill, as they would have to walk through water (and what is below the water) to get to the tank.

In an emergency or during general operations access to the top of a propane container is required. Further, propane vapors are heavier than air. This will force emergency responders, propane servicers, or consumers to potentially become exposed to leaking gas while trying to access valves used for container operation. In a fire situation, flame capture will be complicated due to the elevated installation. This capture will impact responders or create confinement while climbing to the top of the platform to control the release, increasing the potential for extinguishment. Extinguishment of a propane fire, prior to elimination of the source can lead to significant emergency responder exposure, conflagration, or vapor cloud explosions.

In conclusion, F264 should be disapproved. It's an effort to impose unwarranted and unjustified requirements on the use of propane energy systems, a recognized clean-burning alternative fuel.

Bibliography: Flood Resistant Design and Construction, ASCE/SEI 24-14

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

F270-24

IFC: SECTION 202, 202, 202 (New), 6201.1, 6202.1, 6203.1.1, 6203.1.1.1, 6203.1.1.2, 6203.1.1.3, 6203.1.1.4, 6204.1, 6204.1.2, TABLE 6204.1.2, 6204.1.4, 6204.1.5, TABLE 6204.1.7, 6204.1.8, 6204.1.10, 6204.1.11, 6204.2.2, TABLE 105.5.22, 203.6.3, 203.6.5, TABLE 911.1, TABLE 2704.2.2.1, TABLE 5003.1.1(1), TABLE 5003.1.1(3), TABLE 5003.8.2, TABLE 5004.2.2, 5004.7.1, TABLE 5005.2.1.4, E102.1.8.1, E102.1.8.1.1 (New), E102.1.8.1.2 (New), TABLE E102.1.8.1.2 (New), E102.1.8.1.3 (New), TABLE E102.1.8.2 (New), E102.1.8.2 (New), E102.1.8.3 (New), TABLE E102.1.8.3 (New), TABLE E105.1, TABLE F101.2, TABLE H102.1, PGS (New); IBC: SECTION 202, [F] TABLE 307.1(1), [F] 307.3, [F] 307.5, [F] TABLE 414.5.1, [F] TABLE 415.6.5, [F]TABLE 415.11.1.1; IFC: NP (New)

Proposed Change as Submitted

Proponents: Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com)

2024 International Fire Code

Revise as follows:

ORGANIC PEROXIDE.
An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. ~~Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~ Organic peroxide formulation is a pure or technically pure organic peroxide or a mixture of organic peroxides with an active oxygen (aO) concentration greater than 1 percent alone or in combination with one or more materials. Organic peroxide storage classification is based on the organic peroxide transportation type and burning rate. The transport type for organic peroxide formulations is determined by the UN Manual of Tests and Criteria, Part II. The methods used to determine the burning rate of organic peroxide formulations are spelled out in the Storage of Organic Peroxides in The Netherlands (also known as PGS 8). Terms such as accelerator, catalyst, initiator, and curing agent are sometimes used to describe organic peroxide formulations and are misleading because they can also refer to materials that are not or do not contain organic peroxides, some of which might present increased hazard when mixed with organic peroxides.

Class I. Describes those formulations that are capable of *deflagration* but not *detonation*. This class comprises of organic peroxide formulations with transport classification Type B, those with transport classification Type C and Type D with large-scale burning rate equal to or higher than 300 kg/min, and those with transport classification Type C and Type D with small-scale burning rate equal to or higher than 9.0 kg/min × m^2 unless the large-scale burning rate is lower than 300 kg/min.

Class II<u>A</u>. Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C and Type D with a large-scale burning rate equal to or higher than 140 kg/min but lower than 300 kg/min and those with transport classification Type E with a large-scale burning rate equal to or higher than 140 kg/min, those with Type C and Type D if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2 but lower than 9.0 kg/min × m^2, and Type E if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2.

Add new definition as follows:

Class IIB. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C with a large-scale burning rate lower than 140 kg/min, those with transport classification Type D and Type E with a large-scale burning rate equal to or higher than 60 kg/min but lower than 140 kg/min, those with transport classification Type C if the small-scale burning rate is lower than 2.2 kg/min × m^2, and those with transport classification Type D and Type E if the small-scale burning rate is equal to or higher than 0.9 kg/min × m^2 but lower than 2.2 kg/min × m^2.

Revise as follows:

Class III. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.
This class comprises of organic peroxide formulations with transport classification Type D with a large-scale burning rate lower than 60 kg/min, those with transport classification Type E with a large-scale burning rate equal to or higher than 10 kg/min but lower than 60 kg/min, those with transport classification Type F with a large-scale burning rate equal to or higher than 10 kg/min, and those with

transport classification Type D and Type E if the small-scale burning rate is lower than 0.9 kg/min × m^2, and those with transport classification Type F irrespective of the small scale burning rate.

Class IV. Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type E or Type F with a large-scale burning rate lower than 10 kg/min.

Class V. Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type G without additional subsidiary risks.

~~**Unclassified detonable**~~ **Detonable.** *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.

6201.1 Scope. The storage and use of *organic peroxides* shall be in accordance with this chapter and Chapter 50. ~~Unclassified detonable~~ Detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6202.1 Definition. The following term is defined in Chapter 2:
ORGANIC PEROXIDE.

Class I.
Class II~~A~~.
Class IIB.
Class III.
Class IV.
Class V.
~~**Unclassified detonable**~~ **Detonable.**

6203.1.1 Special limitations for indoor storage and use by occupancy. The indoor storage and use of *organic peroxides* shall be in accordance with Sections 6203.1.1.1 through 6203.1.1.4.

Revise as follows:

6203.1.1.1 Group A, E, I or U occupancies. In Group A, E, I or U occupancies, any amount of ~~unclassified~~ detonable and Class I organic peroxides shall be stored in accordance with the following:

1. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6203.1.1.2 Group R occupancies. ~~Unclassified d~~Detonable and Class I *organic peroxides* shall not be stored or used within Group R occupancies.

6203.1.1.3 Group B, F, M or S occupancies. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall not be stored or used in offices, or retail sales areas of Group B, F, M or S occupancies.

6203.1.1.4 Classrooms. In classrooms in Group B, F or M occupancies, any amount of ~~unclassified~~ detonable and Class I *organic peroxides* shall be stored in accordance with the following:

1. ~~Unclassified detonable~~ Detonable and Class I *organic peroxides* shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6204.1 Indoor storage. Indoor storage of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.
Indoor storage of ~~unclassified~~ detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6204.1.2 Distance from detached buildings to exposures. In addition to the requirements of the *International Building Code*, detached storage buildings for Class I, IIA, IIB,III, IV and V *organic peroxides* shall be located in accordance with Table 6204.1.2. Detached buildings containing quantities of ~~unclassified~~ detonable *organic peroxides* in excess of those set forth in Table 5003.8.2 shall be located in accordance with Table 5604.5.2(1).

TABLE 6204.1.2 ORGANIC PEROXIDES—DISTANCE TO EXPOSURES FROM DETACHED STORAGE BUILDINGS OR OUTDOOR STORAGE AREAS

ORGANIC PEROXIDE CLASS	MAXIMUM STORAGE QUANTITY (POUNDS) AT MINIMUM SEPARATION DISTANCE					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
IIA	100,000	200,000	No Limit	100,000[a]	No Limit	No Limit
IIB	175,000	No Limit	No Limit	175,000[a]	No Limit	No Limit
III	200,000	No Limit	No Limit	200,000[a]	No Limit	No Limit
IV	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
V	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where the amount of organic peroxide stored exceeds this amount, the minimum separation shall be 50 feet.

6204.1.4 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in storage areas for Class I, IIA or IIB *organic peroxides* shall comply with the requirements for electrical Class I, Division 2, locations.

6204.1.5 Smoke detection. An *approved* supervised smoke detection system in accordance with Section 907 shall be provided in rooms or areas where Class I, IIA, IIB or III *organic peroxides* are stored. Activation of the smoke detection system shall sound a local alarm.

Exception: A smoke detection system shall not be required in detached storage buildings equipped throughout with an *approved automatic fire-extinguishing system* complying with Chapter 9.

TABLE 6204.1.7 STORAGE OF ORGANIC PEROXIDES

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION				MAXIMUM QUANTITY PER BUILDING
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4[a]	4[b]	Note c
IIA	10	8	4[a]	4[b]	Note c
IIB	10	8	4[a]	4[b]	Note c
III	10	8	4[a]	4[b]	Note c
IV	16	10	3[a, d]	4[b]	No Requirement
V	No Requirement	No Requirement	No Requirement	No Requirement	No Requirement

For SI: 1 foot = 304.8 mm.

a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.

b. Distance to noncombustible walls is allowed to be reduced to 2 feet.

c. See Table 6204.1.2 for maximum quantities.

d. The distance shall be not less than one-half the pile height.

6204.1.8 Location in building. The storage of Class I, IIA or IIB *organic peroxides* shall be on the ground floor. Class III *organic peroxides* shall not be stored in *basements*.

6204.1.10 Explosion control. Indoor storage rooms, areas and buildings containing ~~unclassified~~ detonable and Class I *organic peroxides* shall be provided with explosion control in accordance with Section 911.

6204.1.11 Standby power. Standby power shall be provided in accordance with Section 1203 for the following systems used to protect Class I and ~~unclassified~~ detonable *organic peroxides*:

1. Exhaust ventilation system.
2. Treatment system.
3. Smoke detection system.
4. Temperature control system.
5. *Fire alarm system*.
6. *Emergency alarm system*.

6204.2.2 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing ~~unclassified~~ detonable, Class I, IIA or ~~Class~~ IIB *organic peroxides* shall comply with the requirements for electrical Class I, Division 2, locations.

TABLE 105.5.22 PERMIT AMOUNTS FOR HAZARDOUS MATERIALS

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section 105.5.18
Corrosive materials	
Gases	See Section 105.5.9
Liquids	55 gallons
Solids	1,000 pounds
Explosive materials	See Section 105.5.16
Flammable materials	
Gases	See Section 105.5.9
Liquids	See Section 105.5.18
Solids	100 pounds
Highly toxic materials	
Gases	See Section 105.5.9
Liquids	Any Amount
Solids	Any Amount
Organic peroxides	
Liquids	
Class I	Any Amount
Class IIA	Any Amount
Class IIB	Any Amount
Class III	1 gallon
Class IV	2 gallons
Class V	No Permit Required

TYPE OF MATERIAL	AMOUNT
Solids	
	Any Amount
Class I	
	Any Amount
Class II<u>A</u>	
	<u>Any Amount</u>
<u>Class IIB</u>	
	10 pounds
Class III	
	20 pounds
Class IV	
	No Permit Required
Class V	
Oxidizing materials	
Gases	See Section 105.5.9
Liquids	
Class 4	Any Amount
	1 gallon[a]
Class 3	10 gallons
	55 gallons
Class 2	
Class 1	
Solids	
Class 4	Any Amount
	10 pounds[b]
Class 3	100 pounds
	500 pounds
Class 2	
Class 1	
Pyrophoric materials	
Gases	Any Amount
Liquids	Any Amount
Solids	Any Amount
Toxic materials	
Gases	See Section 105.5.9
Liquids	10 gallons
Solids	100 pounds
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
	Any Amount
Class 3	5 gallons
	10 gallons
Class 2	
Class 1	
Solids	
Class 4	Any Amount
	Any Amount
Class 3	50 pounds
	100 pounds
Class 2	
Class 1	
Water-reactive materials	
Liquids	
Class 3	Any Amount
	5 gallons
Class 2	55 gallons
Class 1	
Solids	
Class 3	Any Amount
	50 pounds
Class 2	500 pounds
Class 1	

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 22 gallons where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 22 gallons or less.

b. 220 pounds where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 220 pounds or less.

203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials
Explosives:
Division 1.1
Division 1.2
Division 1.3
Division 1.4
Division 1.5
Division 1.6
Organic peroxides, u~~nclassified detonable~~ detonable
Oxidizers, Class 4
Unstable (reactive) materials, Class 3 detonable and Class 4

203.6.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less
Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*
Consumer fireworks, 1.4G (Class C, Common)
Cryogenic fluids, oxidizing
Category 1B flammable gases having a burning velocity of 3.9 inches per second (99 mm/s) or less
Flammable solids
Organic peroxides, Class II<u>A, IIB</u> and III
Oxidizers, Class 2
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less
Oxidizing gases
Unstable (reactive) materials, Class 2
Water-reactive materials, Class 2

TABLE 911.1 EXPLOSION CONTROL REQUIREMENTS[f]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
		Hazard Category	
Combustible dusts[a]	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4[i]	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
		Hazard Category	
Flammable gas	Gaseous	Not required	Required[h]
	Liquefied	Not required	Required[h]
Flammable liquids	IA[b]	Not required	Required
	IB[c]	Not required	Required
Organic peroxides	~~Unclassified d~~Detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2[e]	Not required	Required
Special Uses			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems[g]	—	Not required	Required
Energy storage systems[g]	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist[d]	Detonation	Required	Not permitted
	Deflagration	Not required	Required

For SI: 1 inch per second = 25.4 mm/s.

a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2. See definition of “Combustible dust” in Chapter 2.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the International Building Code.

g. Where explosion control is required in Section 1207.6.3.

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second.

i. Does not apply to consumer fireworks, 1.4G.

TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiberLooseBaled		Not Applicable	Not Applicable
	Note b		
	Notes b and c		

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Combustible liquidClass IIClass IIIAClass IIIBCombination Class I, II and IIIA	Not Applicable		Not Applicable
		0.02	
		0.04	
		Not Limited	
		0.08	
Cryogenic gasFlammableOxidizing	Not Applicable	Not Applicable	
			Note d
			2.5
Explosives	Note b	Note b	Note b
Flammable gasGaseousLiquefied	Not Applicable	Not Applicable	
			Note d
			Note d
Flammable liquidClass IAClass IBClass ICCombination Class IA, IB and ICCombination Class I, II and IIIA	Not Applicable		Not Applicable
		0.005	
		0.05	
		0.05	
		0.05	
		0.08	
Flammable solid	0.002	Not Applicable	Not Applicable
Organic peroxide			Not Applicable
~~Unclassified d~~Detonable	Note b	Note b	
Class I	Note b	Note b	
Class II<u>A</u>	0.05	0.0025	
<u>Class IIB</u>	<u>0.1</u>	<u>0.01</u>	
Class III	0.2	0.02	
Class IV	Not Limited	Not Limited	
Class V	Not Limited	Not Limited	
Oxidizing gasGaseousLiquefiedCombination of gaseous and liquefied	Not Applicable	Not Applicable	
			2.5
			2.5
			2.5
OxidizerClass 4Class 3Class 2Class 1Combination Class 1, 2, 3			Not Applicable
	Note b	Note b	
	0.006	0.06	
	0.006	0.06	
	0.006	0.06	
	0.006	0.06	
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive)Class 4Class 3Class 2Class 1			
	Note b	Note b	Note b
	0.05	0.005	Note b
	0.2	0.02	Note b
	Not Limited	Not Limited	Not Limited
Water reactiveClass 3Class 2Class 1			Not Applicable
	0.02 [f]	0.0025	
	0.5	0.05	
	Not Limited	Not Limited	
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

Portions of table not shown remain unchanged.

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]		USE-CLOSED SYSTEMS[b]				USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers [p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
		or		120[d, e]			120[d]			30d
	IB and IC	H-3								
Flammable liquid, combination (IA, IB, IC) [n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	~~UD~~ Detonable	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	~~16~~5[d, e]	(~~16~~5)[d, e]		~~16~~1[d]	(~~16~~1)[d]		~~8~~1[d]	(~~8~~1)[d]
	IIA	H-3	~~1000~~50[d, e]	(~~1000~~50)[d, e]		~~1000~~50[d]	(~~1000~~50)[d]		~~2010~~10[d]	(~~2010~~)[d]
	IIB	H-3	200[d, e]	(200)[d, e]		200[d]	(200)[d]		50[d]	(50)[d]
	III	H-3	~~400~~125[d, e]	(~~400~~125)[d, e]		~~400~~125[d]	(~~400~~125)[d]		~~100~~25[d]	(~~100~~25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited~~, UD = Unclassified Detonable.~~

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.1.1(3) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

MATERIAL	CLASS	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
		Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV)[e]			3,000			1,500		
	1B (Low BV)[e]			195,000			97,500		
	Liquefied			Not Applicable			Not Applicable		
	1A and 1B (High BV)[e]		(300)			(150)			
	1B (Low BV)[e]		(20,000)			(10,000)			
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Liquefied	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	~~Unclassified~~ Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	8~~2~~	(8~~2~~)
	II~~A~~	200	(200)		100	(100)		50~~20~~	(50~~20~~)
	~~II~~B	400	(400)		200	(200)			(100)
	III	840~~500~~	(840~~500~~)					100	
		Not Limited	Not Limited			(400~~250~~)			(200~~50~~)
	IV				400~~250~~			200~~50~~	
		Not Limited	Not Limited			Not Limited			Not Limited
	V				Not Limited			Not Limited	
						Not Limited			Not Limited
					Not Limited			Not Limited	
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	6,000	Not Applicable	Not Applicable	1,500	Not Applicable	Not Applicable
	Liquefied		(600)	Not Applicable		(300)	Not Applicable		
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	200	10	(10)	10	1	(1)
	2	200	(200)	1,000	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). “Low BV” Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.8.2 DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN

Material	Class	Solids and liquids (tons)[a, b]	Gases (cubic feet)[a, b]
Explosives	Division 1.1	Maximum Allowable Quantity	Not Applicable
	Division 1.2	Maximum Allowable Quantity	
	Division 1.3	Maximum Allowable Quantity	
	Division 1.4[e]	Maximum Allowable Quantity	
	Division 1.4[c, e]	1	
	Division 1.5	Maximum Allowable Quantity	
	Division 1.6	Maximum Allowable Quantity	
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	
Organic peroxides	Detonable	Maximum Allowable Quantity	Not Applicable
	Class I	Maximum Allowable Quantity	
	Class IIA	25[f]	
	Class IIB	40[f]	
	Class III	50[f]	
Unstable (reactives) nondetonable	Class 3	125	2,000
	Class 2		10,000
Water reactives	Class 3	125	Not Applicable
	Class 2		
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m^3, 1 ton = 2000 lb = 907.2 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of the International Building Code or Chapter 56 based on the trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 5003.1.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown, and is not manifolded upstream of pressure controls. The gas supply is limited to cylinders that do not exceed 125 pounds water capacity in accordance with DOTn 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

f. Where different classes of organic peroxides are stored in the same building, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.

TABLE 5004.2.2 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE

MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	Liquids	Solids	Liquids
1. Physical-hazard materials					
Combustible liquids	Class II	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IIIA		See Chapter 57		See Chapter 57
	Class IIIB		See Chapter 57		See Chapter 57
Cryogenic fluids			See Chapter 55		See Chapter 55
Explosives		See Chapter 56		See Chapter 56	
Flammable liquids	Class IA	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IB		See Chapter 57		See Chapter 57
	Class IC		See Chapter 57		See Chapter 57
Flammable solids		Not Required	Not Applicable	Not Required	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required	Not Required	Not Required
	Class I				
	Class IIA				
	Class IIB				
	Class III				
	Class IV				
	Class V	Not Required	Not Required	Not Required	Not Required
Oxidizers	Class 4	Required	Required	Not Required	Not Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Pyrophorics		Not Required	Required	Not Required	Required
Unstable (reactives)	Class 4	Required	Required	Required	Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Water reactives	Class 3	Required	Required	Required	Required
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
2. Health-hazard materials					
Corrosives		Not Required	Required	Not Required	Required
Highly toxics		Required	Required	Required	Required
Toxics					

5004.7.1 Exempt applications. Standby or emergency power is not required for mechanical ventilation systems for any of the following:

1. Storage of Class IB and IC *flammable liquids* and Class II and III *combustible liquids* in closed containers not exceeding a capacity of $6^{1}/_{2}$ gallons (25 L).
2. Storage of Class 1 and 2 *oxidizers*.
3. Storage of Class IIA, IIB, III, IV and V *organic peroxides*.
4. Storage of asphyxiant, irritant and radioactive gases.

TABLE 5005.2.1.4 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE

MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE	
1. Physical-hazard materials			
Combustible liquids	Class II	See Chapter 57	See Chapter 57
	Class IIIA	See Chapter 57	See Chapter 57
	Class IIIB	See Chapter 57	See Chapter 57

MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE	
Cryogenic fluids		See Chapter 55	See Chapter 55
Explosives		See Chapter 56	See Chapter 56
Flammable liquids	Class IA	See Chapter 57	See Chapter 57
	Class IB	See Chapter 57	See Chapter 57
	Class IC	See Chapter 57	See Chapter 57
Flammable solids		Not Applicable	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required
	Class I	Required	Required
	Class IIA		
	Class IIB		
	Class III		
	Class IV		
	Class V	Not Required	Not Required
Oxidizers	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1		
Pyrophorics		Required	Required
Unstable (reactives)	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1	Not Required	Required
Water reactives	Class 3	Required	Required
	Class 2		
	Class 1	Not Required	Required
2. Health-hazard materials			
Corrosives		Required	Required
Highly toxics			
Toxics			

E102.1.8.1 Classification of organic peroxides ~~according to hazard~~. ~~Examples include:~~
~~Unclassified: Unclassified *organic peroxides* are capable of *detonation* and are regulated in accordance with Chapter 56.~~

~~Class I: acetyl cyclohexane sulfonyl 60-65 percent concentration by weight, fulfonyl peroxide, benzoyl peroxide over 98 percent concentration, t butyl hydroperoxide 90 percent, t butyl peroxyacetate 75 percent, t butyl peroxyisopropylcarbonate 92 percent, diisopropyl peroxydicarbonate 100 percent, di-n-propyl peroxydicarbonate 98 percent, and di-n-propyl peroxydicarbonate 85 percent.~~

~~Class II: acetyl peroxide 25 percent, t butyl hydroperoxide 70 percent (with DTBP and t BuOH diluents), t butyl peroxybenzoate 98 percent, t butyl peroxy-2-ethylhexanoate 97 percent, t butyl peroxyisobutyrate 75 percent, t butyl peroxyisopropyl carbonate 75 percent, t butyl peroxypivalate 75 percent, dybenzoyl peroxydicarbonate 85 percent, di-sec butyl peroxydicarbonate 98 percent, di-secbutyl peroxydicarbonate 75 percent, 1,1-di-(t butylperoxy) 3,5,5-trimethycyclohexane 95 percent, di-(2-ethythexyl) peroxydicarbonate 97 percent, 2,5-dymethyl-2-5-di (benzoylperoxy) hexane 92 percent, and peroxyacetic acid 43 percent.~~

~~Class III: acetyl cyclohexane sulfonal peroxide 29 percent, benzoyl peroxide 78 percent, benzoyl peroxide paste 55 percent, benzoyl peroxide paste 50 percent peroxide/50 percent butylbenzylphthalate diluent, cumene hydroperoxide 86 percent, di-(4-butylcyclohexyl) peroxydicarbonate 98 percent, t butyl peroxy-2-ethylhexanoate 97 percent, t butyl peroxyneodecanoate 75 percent, decanoyl peroxide 98.5 percent, di-t butyl peroxide 99 percent, 1,1-di-(t butylperoxy)3,5,5-trimethylcyclohexane 75 percent, 2,4-dichlorobenzoyl peroxide 50 percent, di-isopropyl peroxydicarbonate 30 percent, 2,-5-di-methyl-2,5-di-(2-ethylhexanolyperoxy) hexane 90 percent, 2,5-dimethyl-2,5-di-(t butylperoxy) hexane 90 percent and methyl ethyl ketone peroxide 9 percent active oxygen diluted in dimethyl phthalate.~~

~~Class IV: benzoyl peroxide 70 percent, benzoyl peroxide paste 50 percent peroxide/15 percent water/35 percent butylphthalate diluent, benzoyl peroxide slurry 40 percent, benzoyl peroxide powder 35 percent, t butyl hydroperoxide 70 percent, (with water diluent), t butyl peroxy-2-ethylhexanoate 50 percent, decumyl peroxide 98 percent, di-(2-ethylhexal) peroxydicarbonate 40 percent, laurel peroxide 98 percent, p-methane hydroperoxide 52.5 percent, methyl ethyl ketone peroxide 5.5 percent active oxygen and methyl ethyl ketone peroxide 9 percent active oxygen diluted in water and glycols.Class V: benzoyl peroxide 35 percent, 1,1-di-t butyl peroxy 3,5,5-trimethylcyclohexane 40 percent, 2,5-di-(t butyl peroxy) hexane 47 percent and 2,4-pentanedione peroxide 4 percent active oxygen.~~

Organic peroxide requirements in the IFC are based on the hazard classification, burning rate and transport type.

Add new text as follows:

E102.1.8.1.1 Hazard classification. Organic peroxide formulations are classified into seven hazard classifications (Detonable, I, IIA, IIB, III, IV and V). These classifications are used to determine the occupancy classifications and maximum allowable quantities. Detonable organic peroxides are explosive. As such, the storage requirements for detonable organic peroxides are found in Chapter 56, and Chapter 62 contains additional use, handling and transfer provisions.

E102.1.8.1.2 Transport types. Organic peroxides are also categorized based on the explosion hazard rating—referred to as the Transport Type. The transport type for organic peroxide formulations is determined in accordance with the UN RTDG. The explosion hazard levels are divided into "Types" (Type A-G) and a corresponding UN Number is identified based on whether the formulations are liquid or solid, and whether they require temperature control. Table E102.1.8.1.2 lists the transport types, UN Numbers, explosion hazard level and the maximum size container based on the transport type.

TABLE E102.1.8.1.2 TRANSPORT TYPES FOR ORGANIC PEROXIDES

Portions of table not shown remain unchanged.

TRANSPORT TYPE	EXPLOSIVE HAZARD RATING	MAXIMUM CONTAINER SIZE		UN NUMBER			
		Solid	Liquid	Ambient Temperature		Temperature Controlled	
		pounds (kg)	gallons (L)	Liquid	Solid	Liquid	Solid
A	Explosive	NP	NP	NA	NA	NA	NA
B	Very high	55 (25)	8 (30)	3101	3102	3111	3112
C	High	110 (50)	16 (60)	3103	3104	3113	3114
D	Medium	110 (50)	16 (60)	3105	3106	3115	3116
E	Low	882 (400)	60 (225)	3107	3108	3117	3118
F	Very low	IBC or Portable Tank	IBC or Portable Tank	3109	3110	3119	3120
G	None	NL	NL	NA	NA	NA	NA

NA – Not applicable; NL = Not Limited; NP = Not Permitted

E102.1.8.1.3 Burning rate. Organic peroxides are capable of high heat release and large quantities of smoke when they are involved in fire. The burning rate varies for each organic peroxide material and is determined in accordance with PGS 8. The burning rate is calculated from results of large-scale testing or small-scale testing detailed in PGS 8. Where the burning rate is not known, the highest classification for the organic peroxide shall be used.

TABLE E102.1.8.2 STORAGE CLASSIFICATION OF ORGANIC PEROXIDES

TRANSPORT TYPE	BURNING RATE					
	Large Scale Test (kg/minute)	<10	≥10 and <60	≥60 and <140	≥140 and <300	≥300
	OR					
	Small Scale Test[a] (kg/m²/minute)	NA	<0.9	≥0.9 and <2.2	≥2.2 and <9.0	≥9.0
B		I	I	I	I	I

C	IIB	IIB	IIB	IIA	I
D	III	III	IIB	IIA	I
E	IV	III	IIB	IIA	IIA
F	IV	III	III	III	III
G	V	V	V	V	V

a. Solid materials shall be tested using the large-scale test. Liquid materials can be tested using either the large-scale test or the small-scale test.

E102.1.8.2 Classification process. The classification process is based on the definitions of the various classes of organic peroxides. The classification for use in the IFC is based on the transport type and burning rate and is shown in Table E102.1.8.2. For example, a Transport Type C organic peroxide with a burning rate equal to or greater than 300 kilograms (662 pounds) per minute will be treated a Class I organic peroxide; and another Transport Type C organic peroxide with a burning rate less than 140 kilograms (309 pounds) per minute will be treated as a Class IIB organic peroxide.

E102.1.8.3 Organic peroxide classification. Organic peroxides and their corresponding classifications are listed in Table E102.1.8.3.

TABLE E102.1.8.3 ORGANIC PEROXIDE STORAGE CLASSIFICATIONS

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
III	Acetyl acetone peroxide	37187-22-7	≤42	≥48			≥8	3105	Type D	2
III	Acetyl acetone peroxide [as a paste]	37187-22-7	≤32					3106	Type D	20
I	Acetyl cyclohexanesulfonyl peroxide	3179-56-4	≤82				≥12	3112	Type B	3
III	Acetyl cyclohexanesulfonyl peroxide	3179-56-4	≤32		≥68			3115	Type D	
IIA	tert-Amyl hydroperoxide	3425-61-4	≤88	≥6			≥6	3107	Type E	
IIA	tert-Amyl peroxyacetate	690-83-5	≤62	≥38				3105	Type D	
IIA	tert-Amyl peroxybenzoate	4511-39-1	≤100					3103	Type C	
IIA	tert-Amyl peroxy-2-ethylhexanoate	686-31-7	≤100					3115	Type D	
IIB	tert-Amyl peroxy-2-ethylhexanoate	686-31-7	≤52	≥48				3115	Type D	
IIA	tert-Amyl peroxy-2-ethylhexyl carbonate	70833-40-8	≤100					3105	Type D	
I	tert-Amyl peroxy isopropyl carbonate	2372-22-7	≤77	≥23				3103	Type C	
IIA	tert-Amyl peroxyneodecanoate	68299-16-1	≤77	≥23				3115	Type D	
III	tert-Amyl peroxyneodecanoate	68299-16-1	≤47	≥53				3119	Type F	
IIA	tert-Amyl peroxypivalate	29240-17-3	≤77	≥23				3113	Type C	
IIA	tert-Amyl peroxy-3,5,5-trimethylhexanoate	68860-54-8	≤100					3105	Type D	
III	tert-Butyl cumyl peroxide	3457-61-2	>42-100					3109	Type F	
III	tert-Butyl cumyl peroxide	3457-61-2	≤52			≥48		3108	Type E	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IIA	n-Butyl-4,4-di-(tert-butylperoxy)valerate	995-33-5	>52-100					3103	Type C	
III	n-Butyl-4,4-di-(tert-butylperoxy)valerate	995-33-5	≤52			≥48		3108	Type E	
I	tert-Butyl hydroperoxide	75-91-2	>79-90				≥10	3103	Type C	13
IIA	tert-Butyl hydroperoxide	75-91-2	≤80	≥20				3105	Type D	4, 13
IIB	tert-Butyl hydroperoxide	75-91-2	≤79				>14	3107	Type E	13, 23
III	tert-Butyl hydroperoxide	75-91-2	≤72				≥28	3109	Type F	13, 32
I	tert-Butyl hydroperoxide [and] Di-tert-butylperoxide	75-91-2	<82+>9				≥7	3103	Type C	13
I	tert-Butyl monoperoxymaleate	1931-62-0	>52-100					3102	Type B	3
IIB	tert-Butyl monoperoxymaleate	1931-62-0	≤52	≥48				3103	Type C	
IIB	tert-Butyl monoperoxymaleate	1931-62-0	≤52			≥48		3108	Type E	
IIB	tert-Butyl monoperoxymaleate [as a paste]	1931-62-0	≤52					3108	Type E	
I	tert-Butyl peroxyacetate	107-71-1	>52-77	≥23				3101	Type B	3
IIA	tert-Butyl peroxyacetate	107-71-1	>32-52	≥48				3103	Type C	
III	tert-Butyl peroxyacetate	107-71-1	≤32	≥68				3109	Type F	
IIA	tert-Butyl peroxybenzoate	614-45-9	>77-100					3103	Type C	
IIA	tert-Butyl peroxybenzoate	614-45-9	>52-77	≥23				3105	Type D	
IIB	tert-Butyl peroxybenzoate	614-45-9	≤52			≥48		3106	Type D	
IIB	tert-Butyl peroxybutyl fumarate		≤52	≥48				3105	Type D	
IIA	tert-Butyl peroxycrotonate	23474-91-1	≤77	≥23				3105	Type D	
IIA	tert-Butyl peroxydiethylacetate	2550-33-6	≤100					3113	Type C	
IIA	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	>52–100					3113	Type C	
IIB	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	>32-52	≥48				3117	Type E	
IIB	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	≤52			≥48		3118	Type E	
III	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	≤32	≥68				3119	Type F	
III	tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane	3006-82-4 & 2167-23-9	≤12+≤14	≥14		≥60		3106	Type D	
IIA	tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane	3006-82-4 & 2167-23-9	≤31+≤36		≥33			3115	Type D	
IIA	tert-Butyl peroxy-2-ethylhexylcarbonate	34443-12-4	≤100					3105	Type D	
I	tert-Butyl peroxyisobutyrate	109-13-7	>52-77		≥23			3111	Type B	3
IIB	tert-Butyl peroxyisobutyrate	109-13-7	≤52		≥48			3115	Type D	
IIB	tert-Butylperoxy isopropylcarbonate	2372-21-6	≤77	≥23				3103	Type C	
IIA	1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	96319-55-0	≤77	≥23				3105	Type D	
IIB	1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	96319-55-0	≤42			≥58		3108	Type E	
I	tert-Butyl peroxy-2-methylbenzoate	22313-62-8	≤100					3103	Type C	
I	tert-Butyl peroxyneodecanoate	26748-41-4	>77-100					3115	Type D	
I	tert-Butyl peroxyneodecanoate	26748-41-4	≤77	≥23				3115	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IV	tert-Butyl peroxyneodecanoate [as a stable dispersion in water]	26748-41-4	≤52					3119	Type F	
IV	tert-Butyl peroxyneodecanoate [as a stable dispersion in water (frozen)]	26748-41-4	≤42					3118	Type E	
III	tert-Butyl peroxyneodecanoate	26748-41-4	≤32	≥68				3119	Type F	
I	tert-Butyl peroxyneoheptanoate	26748-38-9	≤77	≥23				3115	Type D	
IV	tert-Butyl peroxyneoheptanoate [as a stable dispersion in water]	26748-38-9	≤42					3117	Type E	
IIA	tert-Butyl peroxypivalate	927-07-1	>67-77	≥23				3113	Type C	
IIA	tert-Butyl peroxypivalate	927-07-1	>47-67	≥53				3115	Type D	
IIA	tert-Butyl peroxypivalate	927-07-1	>27-47	≥33				3115	Type D	
III	tert-Butyl peroxypivalate	927-07-1	≤27	≥73				3119	Type F	
IIA	tert-Butylperoxy stearylcarbonate	62476-60-6	≤100					3106	Type D	
IIA	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	>37-100					3105	Type D	
IIA	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	>37-77	≥23				3105	Type D	
III	tert-Butyl peroxy-3,5,5-trimethlyhexanoate	13122-18-4	≤42			≥58		3106	Type D	
III	tert-Butyl peroxy-3,5,5-trimethylhexanoate	13122-18-4	≤37	>63				3109	Type F	
I	3-Chloroperoxybenzoic acid	937-14-4	>57-86			≥14		3102	Type B	3
IIA	3-Chloroperoxybenzoic acid	937-14-4	≤57			≥3	≥40	3106	Type D	
IIA	3-Chloroperoxybenzoic acid	937-14-4	≤77			≥6	≥17	3106	Type D	
IIA	Cumyl hydroperoxide	80-15-9	>90-98	≤10				3107	Type E	13
III	Cumyl hydroperoxide	80-15-9	≤80	≥20				3109	Type F	13, 18
III	Cumyl hydroperoxide	80-15-9	≤90	≥10				3109	Type F	13, 18
I	Cumyl peroxyneodecanoate	26748-47-0	≤87	≥13				3115	Type D	
IIA	Cumyl peroxyneodecanoate	26748-47-0	≤77	≥23				3115	Type D	
III	Cumyl peroxyneodecanoate [as a stable dispersion in water]	26748-47-0	≤52					3119	Type F	
I	Cumyl peroxyneoheptanoate	104852-44-0	≤77	≥23				3115	Type D	
IIA	Cumyl peroxypivalate	23383-59-7	≤77		≥23			3115	Type D	
IIA	Cyclohexanone peroxide(s)	12262-58-7	≤91				≥9	3104	Type C	13
IIB	Cyclohexanone peroxide(s)	12262-58-7	≤72	≥28				3105	Type D	5
IIB	Cyclohexanone peroxide(s) [as a paste]	12262-58-7	≤72					3106	Type D	5, 20
V	Cyclohexanone peroxide(s)	12262-58-7	≤32			≥68		Exempt	Type G	29
IIA	([3R- (3R, 5aS, 6S, 8aS, 9R, 10R, 12S, 12aR**)]-Decahydro-10-methoxy-3, 6, 9-trimethyl-3, 12-epoxy-12H-pyrano [4, 3- j]-1, 2-benzodioxepin)	71963-77-4	<100					3106	Type D	
IIB	Diacetone alcohol peroxides	54693-46-8	≤57		≥26		≥8	3115	Type D	6
IIB	Diacetyl peroxide	110-22-5	≤27		≥73			3115	Type D	7, 13
IIB	Di-tert-amyl peroxide	10508-09-5	≤100					3107	Type E	
IIA	2,2-Di-(tert-amylperoxy)-butane	13653-62-8	≤57	≥43				3105	Type D	
IIA	1,1-Di-(tert-amylperoxy)cyclohexane	15667-10-4	≤82	≥18				3103	Type C	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
I	Dibenzoyl peroxide	94-36-0	>52-100			≤48		3102	Type B	3
I	Dibenzoyl peroxide	94-36-0	>77-94				≥6	3102	Type B	3
IIB	Dibenzoyl peroxide	94-36-0	≤77				≥23	3104	Type C	
IIB	Dibenzoyl peroxide	94-36-0	≤62			≥28	≥10	3106	Type D	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	>52–62					3106	Type D	20
IIB	Dibenzoyl peroxide	94-36-0	>35-52			≥48		3106	Type D	
IIB	Dibenzoyl peroxide	94-36-0	>36-42	≥18			≤40	3107	Type E	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	≤56.5				≥15	3108	Type E	
IIB	Dibenzoyl peroxide [as a paste]	94-36-0	≤52					3108	Type E	20
III	Dibenzoyl peroxide [as a stable dispersion in water]	94-36-0	≤42					3109	Type F	
V	Dibenzoyl peroxide	94-36-0	≤35			≥65		Exempt	Type G	29
I	Di-(4-tert-butylcyclohexyl)peroxydicarbonate	15520-11-3	≤100					3114	Type C	
IIB	Di-(4-tert-butylcyclohexyl)peroxydicarbonate	15520-11-3	≤75				≥ 25	3114	Type C	
IV	Di-(4-tert-butylcyclohexyl)peroxydicarbonate [as a stable dispersion in water]	15520-11-3	≤42					3119	Type F	
IIA	Di-tert-butyl peroxide	110-05-4	>52-100					3107	Type E	
III	Di-tert-butyl peroxide	110-05-4	≤52	≥48				3109	Type F	25
IIB	Di-tert-butyl peroxyazelate	16580-06-6	≤52	≥48				3105	Type D	
IIB	2,2-Di-(tert-butylperoxy)butane	2167-23-9	≤52	≥48				3103	Type C	
I	1,6-Di-(tert-butylperoxycarbonyloxy)hexane		≤72	≥28				3103	Type C	
I	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>80-100					3101	Type B	3
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤72	≥28				3103	Type C	30
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>52-80	≥20				3103	Type C	
IIA	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	>42-52	≥48				3105	Type D	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤42	≥13		≥45		3106	Type D	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤42	≥58				3109	Type F	
III	1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	≤27	≥25				3107	Type E	21
III	1,1-Di-(tert-Butylperoxy)cyclohexane	3006-86-8	≤13	≥13	≥74			3109	Type F	
IIA	1,1-Di-(tert-butylperoxy)cyclohexane [and] Tert-butyl peroxy-2-ethylhexanoate	3006-86-8 & 3006-82-4	≤43+≤16	≥41				3105	Type D	
IIB	Di-n-butyl peroxydicarbonate	16215-49-9	>27-52		≥48			3115	Type D	
IV	Di-n-butyl peroxydicarbonate [as a stable dispersion in water (frozen)]	16215-49-9	≤42					3118	Type E	
III	Di-n-butyl peroxydicarbonate	16215-49-9	≤27		≥73			3117	Type E	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	>62-100					3113	Type C	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	>52-62	≥38				3113	Type C	
I	Di-sec-butyl peroxydicarbonate	19910-65-7	≤52		≥48			3115	Type D	
IIB	Di-(tert-butylperoxyisopropyl) benzene(s)	25155-25-3	>42-100			≤57		3106	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
V	Di-(tert-butylperoxyisopropyl) benzene(s)	25155-25-3	≤42			≥58		Exempt	Type G	29
IIB	Di-(tert-butylperoxy)phthalate	15042-77-0	>42-52	≥48				3105	Type D	
IIB	Di-(tert-butylperoxy)phthalate [as a paste]	15042-77-0	≤52					3106	Type D	20
IIB	Di-(tert-butylperoxy)phthalate	15042-77-0	≤42	≥58				3107	Type E	
IIB	2,2-Di-(tert-butylperoxy)propane	2167-23-9	≤52	≥48				3105	Type D	
III	2,2-Di-(tert-butylperoxy)propane	2167-23-9	≤42	≥13		≥45		3106	Type D	
I	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	>90-100					3101	Type B	3
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤90	≥10				3103	Type C	30
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	>57-90	≥10				3103	Type C	
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤77	≥23				3103	Type C	
III	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤57			≥43		3110	Type F	
IIA	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤57	≥43				3107	Type E	
IIB	1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	≤32	≥26	≥42			3107	Type E	
III	Dicetyl peroxydicarbonate	26322-14-5	≤100					3120	Type F	
IV	Dicetyl peroxydicarbonate [as a stable dispersion in water]	26322-14-5	≤42					3119	Type F	
I	Di-4-chlorobenzoyl peroxide	94-17-7	≤77				≥23	3102	Type B	3
IIB	Di-4-chlorobenzoyl peroxide [as a paste]	94-17-7	≤52					3106	Type D	20
V	Di-4-chlorobenzoyl peroxide	94-17-7	≤32			≥68		Exempt	Type G	29
III	Dicumyl peroxide	80-43-3	>52-100					3110	Type F	12
V	Dicumyl peroxide	80-43-3	≤52			≥48		Exempt	Type G	29
I	Dicyclohexyl peroxydicarbonate	1561-49-5	>91-100					3112	Type B	3
IIA	Dicyclohexyl peroxydicarbonate	1561-49-5	≤91				≥9	3114	Type C	
IV	Dicyclohexyl peroxydicarbonate [as a stable dispersion in water]	1561-49-5	≤42					3119	Type F	
IIB	Didecanoyl peroxide	762-12-9	≤100					3114	Type C	
III	2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane	1705-60-8	≤42			≥58		3106	Type D	
III	2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane	1705-60-8	≤22		≥78			3107	Type E	
I	Di-2,4-dichlorobenzoyl peroxide	133-14-2	≤77				≥23	3102	Type B	3
IIB	Di-2,4-dichlorobenzoyl peroxide [as a paste]	133-14-2	≤52					3118	Type E	
IIB	Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil]	133-14-2	≤52					3106	Type D	
I	Di-(2-ethoxyethyl) peroxydicarbonate		≤52		≥48			3115	Type D	
IIA	Di-(2-ethylhexyl) peroxydicarbonate	16111-62-9	>77-100					3113	Type C	
IIA	Di-(2-ethylhexyl) peroxydicarbonate	16111-62-9	≤77	≥23				3115	Type D	
III	Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water]	16111-62-9	≤62					3119	Type F	
IV	Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water (frozen)]	16111-62-9	≤52					3120	Type F	
I	2,2-Dihydroperoxypropane	2614-76-8	≤27			≥73		3102	Type B	3
IIB	Di-(1-hydroxycyclohexyl)peroxide	2407-94-5	≤100					3106	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
I	Diisobutyryl peroxide	3437-84-1	>32-52	≥48				3111	Type B	3
IIB	Diisobutyryl peroxide	3437-84-1	≤32	≥68				3115	Type D	
IIB	Diisopropylbenzene dihydroperoxide		≤82	≥5			≥5	3106	Type D	24
I	Diisopropyl peroxydicarbonate	105-64-6	>52-100					3112	Type B	3
IIB	Diisopropyl peroxydicarbonate	105-64-6	≤52		≥48			3115	Type D	
IIB	Diisopropyl peroxydicarbonate	105-64-6	≤32	≥68				3115	Type D	
IIB	Dilauroyl peroxide	105-74-8	≤100					3106	Type D	
IV	Dilauroyl peroxide [as a stable dispersion in water]	105-74-8	≤42					3109	Type F	
I	Di-(3-methoxybutyl) peroxydicarbonate	52238-68-3	≤52		≥48			3115	Type D	
I	Di-(2-methylbenzoyl)peroxide	22313-62-8	≤87				≥13	3112	Type B	3
IIA	Di-(3-methylbenzoyl) peroxide + Benzoyl (3-methylbenzoyl) peroxide + Dibenzoyl peroxide		≤20+≤18+≤4		≥58			3115	Type D	
IIB	Di-(4-methylbenzoyl)peroxide [as a paste with silicone oil]	895-85-2	≤52					3106	Type D	
I	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	>82-100					3102	Type B	3
IIA	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	≤82			≥18		3106	Type D	
IIB	2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	2618-77-1	≤82				≥18	3104	Type C	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	>90-100					3103	Type C	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	>52-90	≥10				3105	Type D	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	≤77			≥23		3108	Type E	
III	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	78-63-7	≤52	≥48				3109	Type F	
IIB	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane [as a paste]	78-63-7	≤47					3108	Type E	
I	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>86-100					3101	Type B	3
IIA	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>77-86	≥14				3103	Type C	26
IIA	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	>52-77	≥23				3103	Type C	26
III	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	1068-27-5	≤52			≥48		3106	Type D	
IIA	2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane	13052-09-0	≤100					3113	Type C	
IIA	2,5-Dimethyl-2,5-dihydroperoxyhexane	3025-88-5	≤82				≥18	3104	Type C	
IIA	2,5-Dimethyl-2,5-di-(3,5,5-trimethylhexanoylperoxy)hexane		≤77	≥23				3105	Type D	
IIB	1,1-Dimethyl-3-hydroxybutylperoxyneoheptanoate	110972-57-1	≤52	≥48				3117	Type E	
III	Dimyristyl peroxydicarbonate	53220-22-7	≤100					3116	Type D	
IV	Dimyristyl peroxydicarbonate [as a stable dispersion in water]	53220-22-7	≤42					3119	Type F	
IIB	Di-(2-neodecanoylperoxyisopropyl)benzene	117663-11-3	≤52	≥48				3115	Type D	
IIA	Di-n-nonanoyl peroxide	762-13-0	≤100					3116	Type D	
IIA	Di-n-octanoyl peroxide	762-16-3	≤100					3114	Type C	
I	Di-(2-phenoxyethyl)peroxydicarbonate	41935-39-1	>85-100					3102	Type B	3
IIA	Di-(2-phenoxyethyl)peroxydicarbonate	41935-39-1	≤85				≥15	3106	Type D	

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
III	Dipropionyl peroxide	3248-28-0	≤27		≥73			3117	Type E	
I	Di-n-propyl peroxydicarbonate	16066-38-9	≤100					3113	Type C	
I	Di-n-propyl peroxydicarbonate	16066-38-9	≤77		≥23			3113	Type C	
I	Disuccinic acid peroxide	123-23-9	>72-100					3102	Type B	3, 17
IIB	Disuccinic acid peroxide	123-23-9	≤72				≥28	3116	Type D	
IIA	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>62-82	≥18				3115	Type D	
IIB	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>52-62	≥38				3115	Type D	
III	Di-(3,5,5-trimethylhexanoyl) peroxide	3851-87-4	>38-52	≥48				3115	Type D	
III	Di-(3,5,5-trimethylhexanoyl)peroxide [as a stable dispersion in water]	3851-87-4	≤52					3119	Type F	
III	Di-(3,5,5-trimethylhexanoyl)peroxide	3851-87-4	≤38	≥62				3119	Type F	
IIA	Ethyl 3,3-di-(tert-amylperoxy)butyrate	67567-23-1	≤67	≥33				3105	Type D	
IIA	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	>77-100					3103	Type C	
IIA	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	≤77	≥23				3105	Type D	
III	Ethyl 3,3-di-(tert-butylperoxy)butyrate	55794-20-2	≤52			≥48		3106	Type D	
IIA	1-(2-ethylhexanoylperoxy)-1,3-Dimethylbutyl peroxypivalate	228415-62-1	≤52	≥45	≥10			3115	Type D	
IIA	tert-Hexyl peroxyneodecanoate	62178-88-5	≤71	≥29				3115	Type D	
IIA	tert-Hexyl peroxypivalate	51938-28-4	≤72		≥28			3115	Type D	
IIA	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	95718-78-8	≤77	≥23				3115	Type D	
IIA	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate [as a stable dispersion in water]	95718-78-8	≤52	≥48				3117	Type E	
IV	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	95718-78-8	≤52					3119	Type F	
I	Isopropyl sec-butyl peroxydicarbonat +Di-sec-butyl peroxydicarbonate+Di-isopropyl peroxydicarbonate		≤32+≤15-18+≤12-15	≥38				3115	Type D	
I	Isopropyl sec-butyl peroxydicarbonat +Di-sec-butyl peroxydicarbonate+Di-isopropyl peroxydicarbonate		≤52+≤28+≤22					3111	Type B	3
III	Isopropylcumyl hydroperoxide	26762-93-6	≤72	≥28				3109	Type F	13
IIA	p-Menthyl hydroperoxide	26762-92-5	>72-100					3105	Type D	13
III	p-Menthyl hydroperoxide	26762-92-5	≤72	≥28				3109	Type F	27
IIA	Methylcyclohexanone peroxide(s)		≤67		≥33			3115	Type D	
I	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 8	≥48				3101	Type B	3, 8, 13
IIA/IIB - Consult Manufacturer	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 9	≥55				3105	Type D	9
III	Methyl ethyl ketone peroxide(s)	1338-23-4	See Remark 10	≥60				3107	Type E	10
IIA	Methyl isobutyl ketone peroxide(s)	37206-20-5	≤62	≥19				3105	Type D	22
III	Methyl isopropyl ketone peroxide(s)	33373-82-7	See Remark 31	≥70				3109	Type F	31
IIA	Organic peroxide, Liquid, Sample							3103	Type C	11
IIA	Organic peroxide, Liquid, Sample, Temperature Controlled							3113	Type C	11
IIA	Organic Peroxide, Solid, Sample							3104	Type C	11

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water	UN Number (Generic entry)	Transport Type	Subsidiary risks and remarks
IIA	Organic Peroxide, Solid, Sample, Temperature Controlled							3114	Type C	11
IIA	3,3,5,7,7-Pentamethyl-1,2,4-Trioxepane	215877-64-8	≤100					3107	Type E	
IIA	Peroxyacetic acid, type D, stabilized	79-21-0	≤43					3105	Type D	13, 14, 19
III	Peroxyacetic acid, type E, stabilized	79-21-0	≤43					3107	Type E	13, 15, 19
IV	Peroxyacetic acid, type F, stabilized	79-21-0	≤43					3109	Type F	13, 16, 19
IIA	Peroxylauric acid	2388-12-7	≤100					3118	Type E	
IIA	Pinanyl hydroperoxide	28324-52-9	>56-100					3105	Type D	13
III	Pinanyl hydroperoxide	28324-52-9	≤56	≥44				3109	Type F	
IIA	Polyether poly-tert-butylperoxycarbonate	Proprietary	≤52		≥48			3107	Type E	
IIA	1,1,3,3-Tetramethylbutyl hydroperoxide	5809-08-5	≤100					3105	Type D	
IIA	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate	22288-43-3	≤100					3115	Type D	
IIA	1,1,3,3-Tetramethylbutyl peroxyneodecanoate	51240-95-0	≤72		≥28			3115	Type D	
III	1,1,3,3-Tetramethylbutyl peroxyneodecanoate [as a stable dispersion in water]	51240-95-0	≤52					3119	Type F	
I	1,1,3,3-tetramethylbutyl peroxypivalate	22288-41-1	≤77	≥23				3115	Type D	
IIA	3,6 9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	24748-23-0	≤42	≥58				3105	Type D	28
IV	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	24748-23-0	≤17	≥18		>65		3110	Type F	

1. Diluent type B may always be replaced by Diluent type A. The boiling point of Diluent type B should be at least 60°C higher than the SADT of the organic peroxide formulation.

2. Available (or Active) oxygen less than 4.7 percent.

3. “EXPLOSIVE” subsidiary risk label required.

4. Diluent may be replaced by di-tert-butyl peroxide.

5. Available (or Active) oxygen not greater than 4.7 percent.

6. Hydrogen peroxide not greater than 9 percent, and available (or active) oxygen not greater than 10 percent.

7. Only non-metallic packaging allowed.

8. Available (or Active) oxygen greater than 10 percent but not greater than 10.7 percent, with or without water.

9. Available (or Active) oxygen not greater than 10 percent with or without water.

10. Available (or Active) oxygen not greater than 8.2 percent with or without water.

11. See 2.5.3.2.5.1 of UN RTDG.

12. Up to 2000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.

13. "CORROSIVE" subsidiary risk label required.

14. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (d) of UN RTDG.

15. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (e) of UN RTDG.

16. Peroxyacetic acid formulations which fulfill the criteria of 2.5.3.3.2 (f) of UN RTDG.

17. Addition of water to this organic peroxide will decrease its thermal stability.

18. No "CORROSIVE" subsidiary risk label required for concentrations not greater than 80 percent.

19. Mixtures with hydrogen peroxide, water and acid(s).

20. With Diluent type A with or without water.

21. Diluent type A 25 percent or greater by mass, and in addition to ethylbenzene.

22. Diluent type A 19 percent or greater by mass, and in addition to methyl isobutyl ketone.

23. di-tert-butyl peroxide not greater than 6 percent.

24. 1-isopropylhydroperoxy-4-isopropylhydroxybenzene not greater than 8 percent.

25. Diluent type B with a boiling point greater than 230°F (110°C).

26. Hydroperoxides content not greater than 0.5 percent.

27. Concentrations greater than 56 percent require a "CORROSIVE" subsidiary risk label.

28. Available (or Active) oxygen not greater than 7.6 percent and Diluent type A with a 95-percent boil-off point between 392°F and 500°F (200°C and 260°C).

29. Not subject to the requirements of these Model Regulations for Division 5.2 per the UN RTDG.

30. Diluent type B with boiling point greater than 266°F (130°C).

31. Available (or active) oxygen not greater than 6.7 percent.

32. Tert-Butyl hydroperoxide can be transported and stored in bulk provided that polyethylene saddles are used—DOTn 49 CFR Part 173.225(g) and (h).

Revise as follows:

TABLE E105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	*Standard for Classification of Toxic Mixtures*	E103.1.3.1

CGA P-23—2008	*Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components*	E102.1.2
DOL 29 CFR Part 1910—2023	*Occupational Safety and Health Standards*	E104.1
DOL 29 CFR Part 1910.1200—2012	*Hazard Communication*	E102.1.7.2, E104.1, E104.2
DOTn 49 CFR—2023	*Transportation*	E104.1
DOTn 49 CFR Part 173.127—2005	*Class 5, Division 5.1—Definition and Assignment of Packing Groups*	E102.1.7.2
DOTn 49 CFR Part 173.225 - 2023	Title 49 Code of Federal Regulations; Part 173.225, *Packaging Requirements and Other Provisions for Organic Peroxides*	Table E102.1.8.3
PGS 8—21	*Organic peroxides: Storage – Guideline for the labour-safe, environment-safe and fire-safe storage of organic peroxides*	E102.1.8.1.3
UN ST/SG/AC.10/11 (Rev. 7)—2019	*Manual of Tests and Criteria*	Table E104.2
UN ST/SG/AC.10/1 (Rev 21)—2019	*Recommendations on the Transport of Dangerous Goods*	E102.1.8.1.2, Table E102.1.8.3, Table E104.2
UN ST/SG/AC.10/30 (Rev.7)—2017	*Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards*	E102.1.7.2, E104.1, E104.2, Table E104.2

TABLE F101.2 FIREFIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES

HAZARD CATEGORY	DESIGNATION
Combustible liquid II	F2
Combustible liquid IIIA	F2
Combustible liquid IIIB	F1
Combustible dust	F3 or F2[a]
Combustible fiber	F3
Cryogenic flammable	F4, H3
Cryogenic oxidizing	OX, H3
Explosive	R4
Flammable solid	F2
Flammable gas (gaseous)	F4
Flammable gas (liquefied)	F4
Flammable liquid IA	F4
Flammable liquid IB	F3
Flammable liquid IC	F3
Organic peroxide, ~~UD~~Detonable	R4
Organic peroxide I	F4, R3
Organic peroxide IIA	F3, R3
Organic peroxide IIB	F3, R3
Organic peroxide III	F2, R2
Organic peroxide IV	F1, R1
Organic peroxide V	None
Oxidizing gas (gaseous)	OX
Oxidizing gas (liquefied)	OX
Oxidizer 4	OX4
Oxidizer 3	OX3
Oxidizer 2	OX2
Oxidizer 1	OX1
Pyrophoric gases	F4
Pyrophoric solids, liquids	F3
Unstable reactive 4D	R4
Unstable reactive 3D	R4
Unstable reactive 3N	R2
Unstable reactive 2	R2
Unstable reactive 1	None
Water reactive 3	W3
Water reactive 2	W2
Corrosive	H3, COR
Toxic	H3
Highly toxic	H4

a. F3 = Finely divided solids, typically less than 75 micrometers (µm) (200 mesh), that pose an elevated risk of forming an ignitable dust cloud, such as finely divided sulfur, *National Electric Code* Group E dusts (for example, aluminum, zirconium and titanium) and bisphenol A. F2 = Finely divided solids less than 420 µm (40 mesh) that pose an ordinary risk of forming an ignitable dust cloud.

F—Flammable category.

R—Reactive category.

H—Health category.

W—Special hazard: water reactive.

OX—Special hazard: oxidizing properties.

COR—Corrosive.

~~UD—Unclassified detonable material.~~

4D—Class 4 detonable material.

3D—Class 3 detonable material.

3N—Class 3 nondetonable material.

TABLE H102.1 SECTION II—HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) SUMMARY REPORT[a] (Storage[b] Conditions)[c]

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY[d]		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
Combustible Liquid	C2		5			120	
	C3A					330	
	C3B		6			13,200	
Combustible Fiber	Loose/Baled						
Cryogenics, Flammable	Cryo-Flam					45	
Cryogenic, Oxidizing	Cryo-OX					45	
Flammable Gas	FLG						
(Gaseous)				150			1,000
(Liquefied)						30	
Flammable Liquid	F1A					30	
	F1B & F1C		5			120	
Combination (1A, 1B, 1C)			5			120	
Flammable Solid	FLS				125		
Organic Peroxide	~~OPU~~OPD				~~0~~1		
	OP1				~~5~~16		
	OP2A				~~50~~100		
	OP2B				400		
	OP3				~~125~~840		
	OP4				NL		
	OP5				NL		
Oxidizer	OX4				0		
	OX3				10		
	OX2				250		
	OX1				4,000		

a. Complete a summary report for each *control area* and Group H occupancy.

b. Storage = storage + use-closed + use-open systems.

c. Separate reports are required for use-closed and use-open systems.

d. Include increases for sprinklers or storage in cabinets, if applicable.

(This is an example; add additional hazard classes as needed.)

Add new text as follows:

Revise as follows:

PGS management organization
NEN
Vlinderweg 6
Delft, 2623 AX
Netherlands

8-21 Organic peroxides: Storage -Guidance for the safe storage of organic peroxides.

2024 International Building Code

Revise as follows:

[F] ORGANIC PEROXIDE. An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. ~~Organic peroxides can pose an *explosion* hazard (*detonation* or *deflagration*) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~Organic peroxide formulation is a pure or technically pure organic peroxide or a mixture of organic peroxides with an active oxygen (aO) concentration greater than 1 percent alone or in combination with one or more materials. Organic peroxide storage classification is based on the organic peroxide transportation type and burning rate. The transport type for organic peroxide formulations is determined by the UN Manual of Tests and Criteria, Part II. The methods used to determine the burning rate of organic peroxide formulations are spelled out in the Storage of Organic Peroxides in The Netherlands (also known as PGS 8). Terms such as accelerator, catalyst, initiator, and curing agent are sometimes used to describe organic peroxide formulations and are misleading because they can also refer to materials that are not or do not contain organic peroxides, some of which might present increased hazard when mixed with organic peroxides.

Class I. Those formulations that are capable of *deflagration* but not *detonation*.This class comprises of organic peroxide formulations with transport classification Type B, those with transport classification Type C and Type D with large-scale burning rate equal to or higher than 300 kg/min, and those with transport classification Type C and Type D with small-scale burning rate equal to or higher than 9.0 kg/min × m^2 unless the large-scale burning rate is lower than 300 kg/min.

Class IIA. Those formulations that burn very rapidly and that pose a moderate reactivity hazard.This class comprises of organic peroxide formulations with transport classification Type C and Type D with a large-scale burning rate equal to or higher than 140 kg/min but lower than 300 kg/min and those with transport classification Type E with a large-scale burning rate equal to or higher than 140 kg/min, those with Type C and Type D if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2 but lower than 9.0 kg/min × m^2, and Type E if the small-scale burning rate is equal to or higher than 2.2 kg/min × m^2.

Class IIB. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class comprises of organic peroxide formulations with transport classification Type C with a large-scale burning rate lower than 140 kg/min, those with transport classification Type D and Type E with a large-scale burning rate equal to or higher than 60 kg/min but lower than 140 kg/min, those with transport classification Type C if the small-scale burning rate is lower than 2.2 kg/min × m^2, and those with transport classification Type D and Type E if the small-scale burning rate is equal to or higher than 0.9 kg/min × m^2 but lower than 2.2 kg/min × m^2.

Class III. Those formulations that burn rapidly and that pose a moderate reactivity hazard.This class comprises of organic peroxide formulations with transport classification Type D with a large-scale burning rate lower than 60 kg/min, those with transport classification Type E with a large-scale burning rate equal to or higher than 10 kg/min but lower than 60 kg/min, those with transport classification Type F with a large-scale burning rate equal to or higher than 10 kg/min, and those with transport classification Type D and Type E if the small-scale burning rate is lower than 0.9 kg/min × m^2, and those with transport classification Type F irrespective of the small scale burning rate.

Class IV. Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.This class comprises of organic peroxide formulations of transport classification Type E or Type F with a large-scale burning rate lower than 10 kg/min.

Class V. Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class comprises of organic peroxide formulations of transport classification Type G without additional subsidiary risks.

~~**Unclassified detonable**~~ **Detonable.** *Organic peroxides* that are capable of *detonation*. These peroxides pose an extremely high *explosion* hazard through rapid *explosive* decomposition.

[F] TABLE 307.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL

HAZARD[a, c, i, l, m]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note o	NA	NA	See Note o	NA	NA	See Note o	NA
Combustible fiber [o]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid[n]	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[p]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[p]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[p]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[p]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10[d]
	IB and IC			120[d, e]			120[d]			30[d]
Flammable liquid, combination (IA, IB, IC)[n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	~~UD~~	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Detonable									
	I	H-2	16~~.5~~[d, e]	(16~~.5~~)[d, e]		16~~+~~[d]	(16~~+~~)[d]		8~~+~~[d]	(8~~+~~)[d]
	IIA	H-3	100~~.50~~[d, e]	(100~~.50~~)[d, e]		100.50[d]	(100~~.50~~)[d]		20~~.10~~[d]	(20~~.10~~)[d]
	IIB	H-3	200[d, e]	(200)[d, e]		200[d]	(200)[d]		50[d]	(50)[d]
	III	H-3	400~~.125~~[d, e]	(400~~.125~~)[d, e]		400~~.125~~[d]	(400~~.125~~)[d]		100~~.25~~[d]	(100~~.25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d, e]	NA	NA	1,500[d,e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d,e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; ~~UD = Unclassified Detonable.~~

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of this code and Chapter 38 of the *International Fire Code*.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the International Fire Code. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i . Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j . A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

k . Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

l . For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the International Fire Code.

m . For oxidizers, unstable (reactive) materials, and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 414.2.5.1.

n . For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 414.2.5.2.

o . Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

p. “High BV” Category 1B flammable gas has a burning velocity greater than 3.9 inches per second (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 inches per second (10 cm/s) or less.

[F] 307.3 High-hazard Group H-1. *Buildings* and *structures* containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials
Explosives:

Division 1.1
Division 1.2

Division 1.3
Division 1.4
Division 1.5
Division 1.6

Organic peroxides, ~~unclassified detonable~~ detonable
Oxidizers, Class 4
Unstable (reactive) materials, Class 3 detonable and Class 4

[F] 307.5 High-hazard Group H-3. *Buildings* and *structures* containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less
Combustible fibers, other than *densely packed baled cotton*, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or *explosion* hazard based on information prepared in accordance with Section 414.1.3
Consumer *fireworks*, 1.4G (Class C, Common)
Cryogenic fluids, oxidizing
Category 1B flammable gases having a burning velocity of 3.9 inches per second (10 cm/s) or less
Flammable solids
Organic peroxides, Class II<u>A, IIB</u> and III
Oxidizers, Class 2
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less
Oxidizing gases
Unstable (reactive) materials, Class 2
Water-reactive materials, Class 2

[F] TABLE 414.5.1 EXPLOSION CONTROL REQUIREMENTS[a, h]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4[j]	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required[k]
	Liquefied	Not Required	Required[k]
Flammable liquid	IA[d]	Not Required	Required
	IB[e]	Not Required	Required
Organic peroxides	~~U~~Detonable	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2[g]	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system[i]	—	Not Required	Required
Energy storage system[i]	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist[f]	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the International Fire Code.

c. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the International Fire Code.

i. Where explosion control is required in Section 1207 of the *International Fire Code*.

j. Does not apply to consumer fireworks, Division 1.4G.

k. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second (10 cm/s).

[F] TABLE 415.6.5 DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT SPECIFIED HEREIN			
Material	**Class**	**Solids and Liquids (tons)[a, b]**	**Gases (cubic feet)[a, b]**
Explosives	Division 1.1	Maximum Allowable Quantity	Not Applicable
	Division 1.2	Maximum Allowable Quantity	
	Division 1.3	Maximum Allowable Quantity	
	Division 1.4[e]	Maximum Allowable Quantity	
	Division 1.4[c, e]	1	
	Division 1.5	Maximum Allowable Quantity	
	Division 1.6	Maximum Allowable Quantity	
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	Not Applicable
Organic peroxides	Detonable	Maximum Allowable Quantity	Not Applicable
	Class I	Maximum Allowable Quantity	Not Applicable
	Class IIA	25[f]	Not Applicable
	Class IIB	40[f]	
	Class III	50[f]	Not Applicable
Unstable (reactives) nondetonable	Class 3	1	2,000
	Class 2	25	10,000
Water reactives	Class 3	1	Not Applicable
	Class 2	25	Not Applicable
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of this code or Chapter 56 of the International Fire Code based on trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 307.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) regulations or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, provided that the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required, for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown and is not manifolded upstream of pressure controls. Additionally, the gas supply is limited to cylinders that do not exceed 125 pounds (57 kg) water capacity in accordance with 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

f. Where different classes of organic peroxides are stored in the same building, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.

[F]TABLE 415.11.1.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
		PHYSICAL-HAZARD MATERIALS		
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose	Note b	Not Applicable	Not Applicable
	Baled	Notes b and c		
Combustible liquid	II	Not Applicable	0.02	Not Applicable
	IIIA		0.04	
	IIIB		Not Limited	
Combination Class	I, II and IIIA		0.08	
Cryogenic gas	Flammable	Not Applicable	Not Applicable	Note d
	Oxidizing			2.5
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous	Not Applicable	Not Applicable	Note d
	Liquefied			Note d
Flammable liquid	IA	Not Applicable	0.005	Not Applicable
	IB		0.05	
	IC		0.05	
Combination Class	IA, IB and IC		0.05	
Combination Class	I, II and IIIA		0.08	
Flammable solid		0.002	Not Applicable	Not Applicable
Organic peroxide	~~Unclassified detonable~~ Detonable	Note b	Note b	Not Applicable
	Class I	Note b	Note b	
	Class IIA	0.05	0.0025	

HAZARD CATEGORY		SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP/square foot)
	Class IIB	0.1	0.01	
	Class III	0.2	0.02	
	Class IV	Not Limited	Not Limited	
	Class V	Not Limited	Not Limited	
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	2.5
	Liquefied			2.5
Combination of gaseous and liquefied				2.5
Oxidizer	Class 4	Note b	Note b	Not Applicable
	Class 3	0.006	0.06	
	Class 2	0.006	0.06	
	Class 1	0.006	0.06	
Combination Class	1, 2, 3	0.006	0.06	
Pyrophoric materials		Note b	0.0025	Notes d and e
Unstable (reactive)	Class 4	Note b	Note b	Note b
	Class 3	0.05	0.005	Note b
	Class 2	0.2	0.02	Note b
	Class 1	Not Limited	Not Limited	Not Limited
Water reactive	Class 3	0.02 [f]	0.0025	Not Applicable
	Class 2	0.5	0.05	
	Class 1	Not Limited	Not Limited	
		HEALTH-HAZARD MATERIALS		
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note d
Toxics		Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ *NTP*/square foot = 0.305 m^3 @ *NTP*/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.1(1) and 307.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at *NTP*/square foot or 9,000 cubic feet at *NTP*.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 415.6.5.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

2024 International Fire Code

Add new text as follows:

Reason: Organic peroxides are hazardous materials with key hazard characteristics of thermal instability, explosivity and flammability with high burning rates. Organic peroxides can undergo self-accelerating decomposition and may result in fire and/or explosion when exposed to heat or when they come in contact with incompatible materials. The decomposition process is further accelerated when the containers are confined. The explosion hazard rating for organic peroxides is determined by the transport type testing in accordance with the UN Recommendations on the Transport of Dangerous Goods, Manual of tests and criteria, and is divided into Type A through G. The transport type testing addresses the explosivity hazard of the organic peroxide and the package size but not the flammability or the burning rate. The flammability aspect of organic peroxide is determined by the burning rate test methods listed in PGS8 Storage Code. Organic peroxides burn vigorously once ignited and the burning rates may be significantly high when compared to that of ordinary flammables. Organic peroxide fires may be characterized by large fire heights, high heat release, high flame temperatures and large amounts of smoke. Given the importance of both the explosivity and high flammability characteristics of organic peroxides, it is very important the storage classification takes into consideration both the transport type and burning rate test results, especially as organic peroxides in storage are stored for long term unlike in transport. An organic peroxide fire can significantly impact the inventory in the storage area, the storage building itself, personnel, nearby property, local community and the environment. The proposed storage classification of organic peroxides is based on both the transport type and the burning rate as shown in the below table (included in Appendix E) and the organic peroxide class definitions are defined accordingly. With the proposed changes, the organic peroxides storage class definitions are defined quantitively as against current qualitative definitions. The proposed storage class definitions harmonize with the definitions in NPFA 400 code and the European organic peroxides codes.

Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references, classification details and classification list of all organic peroxides with composition information included. This information provides the code official and code user the storage classification to be used for a given organic peroxide formulation and how this is determined.

STORAGE CLASSIFICATION OF ORGANIC PEROXIDES

TRANSPORT TYPE	BURNING RATE					
	Large Scale Test (kg/minute)	<10	≥10 and <60	≥60 and <140	≥140 and <300	≥300
	OR					
	Small Scale Test [a] (kg/m²/minute)	NA	<0.9	≥0.9 and <2.2	≥2.2 and <9.0	≥9.0
B		I	I	I	I	I
C		IIB	IIB	IIB	IIA	I
D		III	III	IIB	IIA	I
E		IV	III	IIB	IIA	IIA
F		IV	III	III	III	III
G		V	V	V	V	V

a. Solid materials shall be tested using the large-scale test. Liquid materials can be tested using either the large-scale te or the small-scale test.

This code change proposal also revises Unclassified Detonable classification name to Detonable. Organic peroxides are classified by

transport type A to transport type G. There is no such class called Unclassified Detonable. If an organic peroxide is detonable, then it is classified as transport type A per the UN and DOT organic peroxides definitions. As such, Detonable is an appropriate word to denote such class. This change from Unclassified Detonable to Detonable is made throughout Chapter 62, other chapters and appendices.

This code change proposal also proposes organic peroxide classification Class II is split into two classes: Class IIA and Class IIB, since the range of burn rate for Class II is broad - lower limit is 60 kg/min and upper limit is 300 kg/min. By subdividing the range into Class IIA (burn rates of 140 kg/min to 300 kg/min) and Class IIB (60 kg/min to 140 kg/min) we have two classes with materials similarly classed for transportation (Type C, D, or E) by explosion hazard but are distinguished by their burning rate in the storage class definition. This additional distinction of the storage classification system allows better definition of separation distances versus quantity and other features that reflect the burning behavior of the materials, beyond the explosion hazard concerns identified in the transport type designation. This change is made throughout Chapter 62 and other chapters. Maximum quantities are defined for Class IIA and IIB where required. Footnote is added under the maximum quantities table in Chapter 62 which states that when multiple classes of organic peroxides are stored, the sum of the ratios is used to determine the maximum quantity allowed. So even though the proposal is adding Class IIB quantities, the aggregate of all organic peroxide materials must be considered based on the footnote which is more restrictive than the current code.

The IFC Organic Peroxides Task Group is aware of IFC's intention to align storage classification definitions with GHS classifications in this code cycle as the GHS classification is listed on a safety data sheet of each material and a fire code official can then easily determine the storage classification of that material. In the case of organic peroxides, however, the GHS classification aligns with transport type definitions. The transport type testing, as explained above, addresses only the explosivity hazard of the organic peroxide and not the flammability or the burning rate. This proposal requests that the storage classifications for organic peroxides be as proposed in this code change proposal which is based on both the transport type and the burning rate, and an exception be made for organic peroxides to not align with GHS classifications. The storage classification for all organic peroxides is easily available for a code official as this is now listed in the Appendix E.

If the organic peroxide storage classification definitions are aligned with GHS definitions:

1. 20 organic peroxide formulations which are classified as Class I based on transport type and burning rate will be classified in a less severe hazard class of Class II organic peroxides based on GHS definition.
2. 24 organic peroxide formulations which are classified as Class II (IIA or IIB) based on transport type and burning rate will be classified in a less severe hazard class of Class III organic peroxides based on GHS definition.
3. 27 organic peroxide formulations which are classified as Class III based on transport type and burning rate will be classified in a less severe hazard class of Class IV organic peroxides based on GHS definition.
4. a total of 71 organic peroxide formulations will be classified in a less severe hazard class despite the presence of high burning rate hazard. Classifying the organic peroxide formulation into a less severe hazard class means a code user would be allowed to store increased quantities and/or at a shorter separation distance which will put the code user's storage area, personnel, nearby property, local community and the environment at increased risk in case of a fire.
5. 15 organic peroxide formulations which are classified as Class IV based on transport type and burning rate will be classified in a more severe hazard class of Class III organic peroxides based on GHS definition. These Class IV formulations are those that do not burn at all, or their burning rate is significantly low due to the presence of decompositions products like carbon dioxide, and these will be reclassified to a higher hazard storage class despite their lower hazard.

Therefore, it is strongly requested that an exception be made for organic peroxides to not align with GHS classifications and classify as proposed based on both the burning rate and explosivity hazard.

Bibliography: Safety and Handling of Organic Peroxides - American Chemistry Council

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to define and update storage classification of organic peroxides based on both the explosivity and flammability hazards. This code change proposal also revises Unclassified Detonable classification name change to Detonable and split Class II into two classes: Class IIA and Class IIB

for the reasons stated in reason statement. These changes are made throughout Chapter 62, other chapters and appendices. Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references, classification details and classification list of all organic peroxides with composition information included. The information provided in this proposal helps both the code official and the code user to effectively implement the code. The proposal does not impact the cost of construction.

F270-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved as it would not be consistent with the previous actions aligning the IFC definitions with GHS. There was some support for the burn rate data but the current format of the definitions does not work. (Vote 13-0)

F270-24

Individual Consideration Agenda

Comment 1:

IFC: 6201.1, 6202.1, 6203.1.1.1, 6203.1.1.2, 6203.1.1.3, 6203.1.1.4, 6204.1, 6204.1.2, TABLE 6204.1.2, 6204.1.4, 6204.1.5, TABLE 6204.1.7, 6204.1.8, 6204.1.10, 6204.1.11, 6204.2.2, TABLE 105.5.22, 203.6.3, 203.6.5; IBC: [F] 307.3, [F] 307.5; IFC: TABLE 911.1, TABLE 2704.2.2.1; IBC: [F] TABLE 414.5.1; IFC: TABLE 5003.1.1(1), TABLE 5003.1.1(3), TABLE 5003.8.2, TABLE 5004.2.2, 5004.7.1, TABLE 5005.2.1.4, E102.1.8.1, E102.1.8.1.1 (New), E102.1.8.1.2 (New), E102.1.8.1.3 (New), E102.1.8.2 (New), TABLE E102.1.8.2 (New), E102.1.8.3 (New), TABLE E102.1.8.3 (New), TABLE E105.1, TABLE F101.2, TABLE H102.1, PGS (New)

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Kris Jaggari, Nouryon/OPPSD Representative (kris.jaggari@nouryon.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Fire Code

6201.1 Scope. The storage and use of *organic peroxides* shall be in accordance with this chapter and Chapter 50. ~~Unclassified d~~Detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6202.1 Definition. The following term is defined in Chapter 2:
ORGANIC PEROXIDE.

Class I.

Class II~~A~~.

Class IIB.

Class III.

Class IV.

Class V.

~~**Unclassified d**~~ **Detonable.**

6203.1.1.1 Group A, E, I or U occupancies. In Group A, E, I or U occupancies, any amount of ~~unclassified~~ detonable and Class I organic peroxides shall be stored in accordance with the following:

1. 1. ~~Unclassified d~~ Detonable and Class I organic peroxides shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6203.1.1.2 Group R occupancies. ~~Unclassified d~~Detonable and Class I organic peroxides shall not be stored or used within Group R occupancies.

6203.1.1.3 Group B, F, M or S occupancies. ~~Unclassified d~~Detonable and Class I organic peroxides shall not be stored or used in offices, or retail sales areas of Group B, F, M or S occupancies.

6203.1.1.4 Classrooms. In classrooms in Group B, F or M occupancies, any amount of ~~unclassified~~ detonable and Class I organic peroxides shall be stored in accordance with the following:

1. 1. ~~Unclassified d~~ Detonable and Class I organic peroxides shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6204.1 Indoor storage. Indoor storage of *organic peroxides* in amounts exceeding the *maximum allowable quantity per control area* indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.
Indoor storage of ~~unclassified~~ detonable organic peroxides that are capable of detonation in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6204.1.2 Distance from detached buildings to exposures. In addition to the requirements of the InternationalBuilding Code, detached storage buildings for Class I, IIA, IIB,III, IV and V organic peroxides shall be in accordancewith Table 6204.1.2. Detached buildingscontaining quantities of ~~unclassified~~ detonable organicperoxides in excess of those set forth in Table 5003.8.2shall be located in accordance with Table 5604.5.2(1).

TABLE 6204.1.2 ORGANIC PEROXIDES—DISTANCE TO EXPOSURES FROM DETACHED STORAGE BUILDINGS OR OUTDOOR STORAGE AREAS

ORGANIC PEROXIDE CLASS	MAXIMUM STORAGE QUANTITY (POUNDS) AT MINIMUM SEPARATION DISTANCE					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
IIA	100,000	200,000	No Limit	100,000[a]	No Limit	No Limit
IIB	175, 000	No Limit	No Limit	175,000[a]	No Limit	No Limit
III	200,000	No Limit	No Limit	200,000[a]	No Limit	No Limit
IV	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
V	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where the amount of organic peroxide stored exceeds this amount, the minimum separation shall be 50 feet.

6204.1.4 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in

storage areas for Class I, IIA or IIB organic peroxides shall comply with the requirements for electrical Class I, Division 2, locations.

6204.1.5 Smoke detection. An approved supervised smoke detection system in accordance with Section 907 shall be provided in rooms or areas where Class I, IIA, IIB or III organic peroxides are stored. Activation of the smoke detection system shall sound a local alarm. **Exception:** A smoke detection system shall not be required in detached storage buildings equipped throughout with an *approved automatic fire-extinguishing system* complying with Chapter 9.

TABLE 6204.1.7 STORAGE OF ORGANIC PEROXIDES

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION				MAXIMUM QUANTITY PER BUILDING
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4[a]	4[b]	Note c
IIA	10	8	4[a]	4[b]	Note c
IIB	10	8	4[a]	4[b]	Note c
III	10	8	4[a]	4[b]	Note c
IV	16	10	3[a, d]	4[b]	No Requirement
V	No Requirement	No Requirement	No Requirement	No Requirement	No Requirement

For SI: 1 foot = 304.8 mm.

a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.

b. Distance to noncombustible walls is allowed to be reduced to 2 feet.

c. See Table 6204.1.2 for maximum quantities.

d. The distance shall be not less than one-half the pile height.

6204.1.8 Location in building. The storage of Class I, IIA or IIB organic peroxides shall be on the ground floor. Class III organic peroxides shall not be stored in basements.

6204.1.10 Explosion control. Indoor storage rooms, areas and buildings containing ~~unclassified~~ detonable and Class I organic peroxides shall be provided with explosion control in accordance with Section 911.

6204.1.11 Standby power. Standby power shall be provided in accordance with Section 1203 for the following systems used to protect Class I and ~~unclassified~~ detonable organic peroxides:

1. Exhaust ventilation system.
2. Treatment system.
3. Smoke detection system.
4. Temperature control system.
5. *Fire alarm system*.
6. *Emergency alarm system*.

6204.2.2 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing ~~unclassified~~ detonable, Class I, IIA or ~~Class~~ IIB organic peroxides shall comply with the requirements for electrical Class I, Division 2, locations.

TABLE 105.5.22 PERMIT AMOUNTS FOR HAZARDOUS MATERIALS

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section 105.5.18
Corrosive materials	

TYPE OF MATERIAL	AMOUNT
Gases	See Section 105.5.9
Liquids	55 gallons
Solids	1,000 pounds
Explosive materials	See Section 105.5.16
Flammable materials	
Gases	See Section 105.5.9
Liquids	See Section 105.5.18
Solids	100 pounds
Highly toxic materials	
Gases	See Section 105.5.9
Liquids	Any Amount
Solids	Any Amount
Organic peroxides	
Liquids	Any Amount
Class I	Any Amount
Class II<u>A</u>	<u>Any Amount</u>
<u>Class IIB</u>	1 gallon
Class III	2 gallons
Class IV	No Permit Required
Class V	
Solids	Any Amount
Class I	Any Amount
Class II<u>A</u>	<u>Any Amount</u>
<u>Class IIB</u>	10 pounds
Class III	20 pounds
Class IV	No Permit Required
Class V	
Oxidizing materials	
Gases	See Section 105.5.9
Liquids	
Class 4	Any Amount
Class 3	1 gallon[a] 10 gallons
Class 2	55 gallons
Class 1	
Solids	
Class 4	Any Amount
Class 3	10 pounds[b] 100 pounds
Class 2	500 pounds
Class 1	
Pyrophoric materials	
Gases	Any Amount
Liquids	Any Amount
Solids	Any Amount
Toxic materials	
Gases	See Section 105.5.9
Liquids	10 gallons
Solids	100 pounds

TYPE OF MATERIAL	AMOUNT
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
Class 3	Any Amount 5 gallons
Class 2	10 gallons
Class 1	
Solids	
Class 4	Any Amount
Class 3	Any Amount 50 pounds
Class 2	100 pounds
Class 1	
Water-reactive materials	
Liquids	
Class 3	Any Amount
Class 2	5 gallons 55 gallons
Class 1	
Solids	
Class 3	Any Amount
Class 2	50 pounds 500 pounds
Class 1	

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 22 gallons where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 22 gallons or less.

b. 220 pounds where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 220 pounds or less.

203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, ~~unclassified~~ detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

203.6.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a*physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or *combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *International Building Code*

Consumer fireworks, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (99 mm/s) or less

Flammable solids

Organic peroxides, Class II<u>A, IIB</u> and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

2024 International Building Code

[F] 307.3 High-hazard Group H-1. *Buildings* and *structures* containing materials that pose a *detonation* hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable *pyrophoric* materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, ~~unclassified~~ detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

[F] 307.5 High-hazard Group H-3. *Buildings* and *structures* containing materials that readily support combustion or that pose a *physical hazard* shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA *flammable or combustible liquids* that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than *densely packed baled cotton*, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or *explosion* hazard based on information prepared in accordance with Section 414.1.3

Consumer *fireworks*, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (10 cm/s) or less

Flammable solids

Organic peroxides, Class II<u>A, IIB</u> and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

2024 International Fire Code

TABLE 911.1 EXPLOSION CONTROL REQUIREMENTS[f]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
		Hazard Category	
Combustible dusts[a]	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4[i]	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required[h]
	Liquefied	Not required	Required[h]
Flammable liquids	IA[b]	Not required	Required
	IB[c]	Not required	Required
Organic peroxides	~~Unclassified d~~<u>D</u>etonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2[e]	Not required	Required
		Special Uses	
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems[g]	—	Not required	Required
Energy storage systems[g]	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist[d]	Detonation	Required	Not permitted
	Deflagration	Not required	Required

For SI: 1 inch per second = 25.4 mm/s.

a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2. See definition of “Combustible dust” in Chapter 2.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the International Building Code.

g. Where explosion control is required in Section 1207.6.3.

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second.

i. Does not apply to consumer fireworks, 1.4G.

TABLE 2704.2.2.1 QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiberLoose Baled		Not Applicable	Not Applicable
	Note b		
	Notes b and c		
Combustible liquidClass II Class IIIA Class IIIB Combination Class I, II and IIIA	Not Applicable		Not Applicable
		0.02	
		0.04	
		Not Limited	
		0.08	
Cryogenic gasFlammable Oxidizing	Not Applicable	Not Applicable	
			Note d
			2.5
Explosives	Note b	Note b	Note b
Flammable gasGaseous Liquefied	Not Applicable	Not Applicable	
			Note d
			Note d
Flammable liquidClass IA Class IB Class IC Combination Class IA, IB and IC Combination Class I, II and IIIA	Not Applicable		Not Applicable
		0.005	
		0.05	
		0.05	
		0.05	
		0.08	
Flammable solid	0.002	Not Applicable	Not Applicable

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Organic peroxide			Not Applicable
~~Unclassified d~~Detonable	Note b	Note b	
Class I	Note b	Note b	
Class II<u>A</u>	0.05	0.0025	
<u>Class IIB</u>	<u>0.1</u>	<u>0.01</u>	
Class III	0.2	0.02	
Class IV	Not Limited	Not Limited	
Class V	Not Limited	Not Limited	
Oxidizing gasGaseous Liquefied Combination of gaseous and liquefied	Not Applicable	Not Applicable	
			2.5
			2.5
			2.5
OxidizerClass 4 Class 3 Class 2 Class 1 Combination Class 1, 2, 3			Not Applicable
	Note b	Note b	
	0.006	0.06	
	0.006	0.06	
	0.006	0.06	
	0.006	0.06	
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive)Class 4 Class 3 Class 2 Class 1			
	Note b	Note b	Note b
	0.05	0.005	Note b
	0.2	0.02	Note b
	Not Limited	Not Limited	Not Limited
Water reactiveClass 3 Class 2 Class 1			Not Applicable
	0.02 [f]	0.0025	
	0.5	0.05	
	Not Limited	Not Limited	
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

[F] TABLE 414.5.1 EXPLOSION CONTROL REQUIREMENTS[a, n]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems[b]
HAZARD CATEGORY			
Combustible dusts[c]	—	Not Required	Required
Cryogenic flammables	—	Not Required	Required
Explosives	Division 1.1	Required	Not Required
	Division 1.2	Required	Not Required
	Division 1.3	Not Required	Required
	Division 1.4[j]	Not Required	Required
	Division 1.5	Required	Not Required
	Division 1.6	Required	Not Required
Flammable gas	Gaseous	Not Required	Required[k]
	Liquefied	Not Required	Required[k]
Flammable liquid	IA[d]	Not Required	Required
	IB[e]	Not Required	Required
Organic peroxides	~~U~~Detonable	Required	Not Permitted
	I	Required	Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	—	Not Required	Required
Unstable (reactive)	4	Required	Not Permitted
	3 Detonable	Required	Not Permitted
	3 Nondetonable	Not Required	Required
Water-reactive liquids and solids	3	Not Required	Required
	2[g]	Not Required	Required
SPECIAL USES			
Acetylene generator rooms	—	Not Required	Required
Electrochemical energy storage system[i]	—	Not Required	Required
Energy storage system[i]	—	Not Required	Required
Grain processing	—	Not Required	Required
Liquefied petroleum gas-distribution facilities	—	Not Required	Required
Where explosion hazards exist[f]	Detonation	Required	Not Permitted
	Deflagration	Not Required	Required

a. See Section 414.1.3.

b. See the International Fire Code.

c. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2 of the *International Fire Code*. See definition of "Combustible dust" in Chapter 2.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

h. Explosion venting is not required for Group H-5 fabrication areas complying with Section 415.11.1 and the International Fire Code.

i. Where explosion control is required in Section 1207 of the *International Fire Code*.

j. Does not apply to consumer fireworks, Division 1.4G.

k. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second (10 cm/s).

TABLE 5003.1.1(1) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers [p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
CryogenicFlammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
CryogenicInert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
CryogenicOxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			
Flammable liquid[n]	IA	H-2	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
		or		120[d, e]			120[d]			30d
	IB and IC	H-3								
Flammable liquid, combination (IA, IB, IC) [n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	~~UD~~Detonable	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	16~~5~~[d, e]	(16~~5~~)[d, e]		16~~1~~[d]	(16~~1~~)[d]		8~~1~~[d]	(8~~1~~)[d]
	II~~A~~	H-3	100~~50~~[d, e]	(100~~50~~)[d, e]		100~~50~~[d]	(100~~50~~)[d]		20~~10~~[d]	(20~~10~~)[d]
	II~~B~~	H-3	200[d, e]	(200)[d, e]		200[d]	(200)[d]		50[d]	(50)[d]
	III	H-3	400~~125~~[d, e]	(400~~125~~)[d, e]		400~~125~~[d]	(400~~125~~)[d]		100~~25~~[d]	(100~~25~~)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d,e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited~~, UD = Unclassified Detonable~~.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *International Building Code* and Chapter 38.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or storedin Group S occupancies, see Section 5003.11..

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.1.1(3) MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

MATERIAL	CLASS	STORAGE[b] Solid pounds (cubic feet)	STORAGE[b] Liquid gallons (pounds)[d]	STORAGE[b] Gas cubic feet at NTP	USE-CLOSED SYSTEMS[b] Solid pounds (cubic feet)	USE-CLOSED SYSTEMS[b] Liquid gallons (pounds)[d]	USE-CLOSED SYSTEMS[b] Gas cubic feet at NTP	USE-OPEN SYSTEMS[b] Solid pounds (cubic feet)	USE-OPEN SYSTEMS[b] Liquid gallons (pounds)[d]
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV)[e]			3,000			1,500		
	1B (Low BV)[e]			195,000			97,500		
	Liquefied			Not Applicable			Not Applicable		
	1A and 1B (High BV)[e]		(300)			(150)			
	1B (Low BV)[e]		(20,000)			(10,000)			
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Liquefied	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	~~Unclassified~~ Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	~~8~~	(~~8~~)
	II~~A~~	200	(200)		100	(100)		50~~20~~	(50~~20~~)
	IIB	400	(400)		200	(200)		100	(100)
	III	840~~500~~	(840~~500~~)		400~~250~~	(400~~250~~)		200~~50~~	(200~~50~~)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizer	4	2	(2)	Not Applicable	1	(1)	Not Applicable	0.25	(0.25)
	3	40	(40)		20	(20)		4	(4)
	2	1,000	(1,000)		500	(500)		100	(100)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
Oxidizing gas	Gaseous	Not Applicable	Not Applicable	6,000	Not Applicable	Not Applicable	1,500	Not Applicable	Not Applicable
	Liquefied		(600)	Not Applicable		(300)	Not Applicable		
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4	2	(2)	20	1	(1)	2	0.25	(0.25)
	3	20	(20)	200	10	(10)	10	1	(1)
	2	200	(200)	1,000	100	(100)	250	10	(10)
	1	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Water reactive	3	20	(20)	Not Applicable	10	(10)	Not Applicable	1	(1)
	2	200	(200)		100	(100)		10	(10)
	1	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

TABLE 5003.8.2 DETACHED BUILDING REQUIRED

Material	Class	A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN: Solids and liquids (tons)[a, b]	Gases (cubic feet)[a, b]
Explosives	Division 1.1	Maximum Allowable Quantity	Not Applicable
	Division 1.2	Maximum Allowable Quantity	
	Division 1.3	Maximum Allowable Quantity	
	Division 1.4[e]	Maximum Allowable Quantity	
	Division 1.4[c, e]	1	
	Division 1.5	Maximum Allowable Quantity	
	Division 1.6	Maximum Allowable Quantity	

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	**Class**	**Solids and liquids (tons)**	**Gases (cubic feet)**
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	
Organic peroxides	Detonable	Maximum Allowable Quantity	Not Applicable
	Class I	Maximum Allowable Quantity	
	Class II<u>A</u>	25[f]	
	<u>Class IIB</u>	<u>40[f]</u>	
	Class III	50[f]	
Unstable (reactives) nondetonable	Class 3	125	2,000
	Class 2		10,000
Water reactives	Class 3	125	Not Applicable
	Class 2		
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m^3, 1 ton = 2000 lb = 907.2 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of the International Building Code or Chapter 56 based on the trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. “Maximum Allowable Quantity” means the maximum allowable quantity per control area set forth in Table 5003.1.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown, and is not manifolded upstream of pressure controls. The gas supply is limited to cylinders that do not exceed 125 pounds water capacity in accordance with DOTn 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

f. <u>Where different classes of organic peroxides are stored in the same building, the aggregate sum of the ratios of the actual quantity divided by the allowed quantity for each class shall not exceed one.</u>

TABLE 5004.2.2 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE

MATERIAL		**INDOOR STORAGE**		**OUTDOOR STORAGE**	
		Solids	**Liquids**	**Solids**	**Liquids**
		1. Physical-hazard materials			
Combustible liquids	Class II	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IIIA		See Chapter 57		See Chapter 57
	Class IIIB		See Chapter 57		See Chapter 57
Cryogenic fluids			See Chapter 55		See Chapter 55
Explosives		See Chapter 56		See Chapter 56	
Flammable liquids	Class IA	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IB		See Chapter 57		See Chapter 57
	Class IC		See Chapter 57		See Chapter 57
Flammable solids		Not Required	Not Applicable	Not Required	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required	Not Required	Not Required
	Class I				
	Class II<u>A</u>				
	<u>Class IIB</u>				
	Class III				
	Class IV				

MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	Liquids	Solids	Liquids
	Class V	Not Required	Not Required	Not Required	Not Required
Oxidizers	Class 4	Required	Required	Not Required	Not Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Pyrophorics		Not Required	Required	Not Required	Required
Unstable (reactives)	Class 4	Required	Required	Required	Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Water reactives	Class 3	Required	Required	Required	Required
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
		2. Health-hazard materials			
Corrosives		Not Required	Required	Not Required	Required
Highly toxics		Required	Required	Required	Required
Toxics					

5004.7.1 Exempt applications. Standby or emergency power is not required for mechanical ventilation systems for any of the following:

1. Storage of Class IB and IC *flammable liquids* and Class II and III *combustible liquids* in closed containers not exceeding a capacity of $6\,^{1}/_{2}$ gallons (25 L).
2. Storage of Class 1 and 2 *oxidizers*.
3. Storage of Class II<u>A, IIB</u>, III, IV and V organic peroxides.
4. Storage of asphyxiant, irritant and radioactive gases.

TABLE 5005.2.1.4 REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE

MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE	
	1. Physical-hazard materials		
Combustible liquids	Class II	See Chapter 57	See Chapter 57
	Class IIIA	See Chapter 57	See Chapter 57
	Class IIIB	See Chapter 57	See Chapter 57
Cryogenic fluids		See Chapter 55	See Chapter 55
Explosives		See Chapter 56	See Chapter 56
Flammable liquids	Class IA	See Chapter 57	See Chapter 57
	Class IB	See Chapter 57	See Chapter 57
	Class IC	See Chapter 57	See Chapter 57
Flammable solids		Not Applicable	Not Applicable
Organic peroxides	~~Unclassified~~ Detonable	Required	Required
	Class I	Required	Required
	Class II<u>A</u>		
	<u>Class IIB</u>		
	Class III		
	Class IV		
	Class V	Not Required	Not Required
Oxidizers	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1		
Pyrophorics		Required	Required
Unstable (reactives)	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1	Not Required	Required
Water reactives	Class 3	Required	Required
	Class 2		
	Class 1	Not Required	Required
	2. Health-hazard materials		
Corrosives		Required	Required
Highly toxics			
Toxics			

E102.1.8.1 Classification of organic peroxides ~~according to hazard~~. ~~Examples include:~~

~~Unclassified: Unclassified *organic peroxides* are capable of *detonation* and are regulated in accordance with Chapter 56.~~

~~Class I: acetyl cyclohexane sulfonyl 60-65 percent concentration by weight, fulfonyl peroxide, benzoyl peroxide over 98 percent concentration, t butyl hydroperoxide 90 percent, t butyl peroxyacetate 75 percent, t butyl peroxyisopropylcarbonate 92 percent, diisopropyl peroxydicarbonate 100 percent, di-n-propyl peroxydicarbonate 98 percent, and di-n-propyl peroxydicarbonate 85 percent.~~

~~Class II: acetyl peroxide 25 percent, t butyl hydroperoxide 70 percent (with DTBP and t BuOH diluents), t butyl peroxybenzoate 98 percent, t butyl peroxy-2-ethylhexanoate 97 percent, t butyl peroxyisobutyrate 75 percent, t butyl peroxyisopropyl-carbonate 75 percent, t butyl peroxypivalate 75 percent, dybenzoyl peroxydicarbonate 85 percent, di-sec butyl peroxydicarbonate 98 percent, di-secbutyl peroxydicarbonate 75 percent, 1,1-di-(t butylperoxy)-3,5,5-trimethyecyclohexane 95 percent, di-(2-ethythexyl) peroxydicarbonate 97 percent, 2,5-dymethyl-2-5-di-(benzoylperoxy) hexane 92 percent, and peroxyacetic acid 43 percent.~~

~~Class III: acetyl cyclohexane sulfonal peroxide 29 percent, benzoyl peroxide 78 percent, benzoyl peroxide paste 55 percent, benzoyl peroxide paste 50 percent peroxide/50 percent butylbenzylphthalate diluent, cumene hydroperoxide 86 percent, di-(4-butylcyclohexyl) peroxydicarbonate 98 percent, t butyl peroxy-2-ethylhexanoate 97 percent, t butyl peroxyneodecanoate 75 percent, decanoyl peroxide 98.5 percent, di-t butyl peroxide 99 percent, 1,1-di-(t butylperoxy)3,5,5-trimethylcyclohexane 75 percent, 2,4-dichlorobenzoyl peroxide 50 percent, di-isopropyl peroxydicarbonate 30 percent, 2,-5-di-methyl-2,5-di-(2-ethylhexanolyperoxy)-hexane 90 percent, 2,5-dimethyl-2,5-di-(t butylperoxy) hexane 90 percent and methyl ethyl ketone peroxide 9 percent active oxygen diluted in dimethyl phthalate.~~

~~Class IV: benzoyl peroxide 70 percent, benzoyl peroxide paste 50 percent peroxide/15 percent water/35 percent butylphthalate diluent, benzoyl peroxide slurry 40 percent, benzoyl peroxide powder 35 percent, t butyl hydroperoxide 70 percent, (with water diluent), t butyl peroxy-2-ethylhexanoate 50 percent, decumyl peroxide 98 percent, di-(2-ethylhexal) peroxydicarbonate 40 percent, laurel peroxide 98 percent, p-methane hydroperoxide 52.5 percent, methyl ethyl ketone peroxide 5.5 percent active oxygen and methyl ethyl ketone peroxide 9 percent active oxygen diluted in water and glycols.Class V: benzoyl peroxide 35 percent, 1,1-di-t butyl peroxy-3,5,5-trimethylcyclohexane 40 percent, 2,5-di-(t butyl peroxy) hexane 47 percent and 2,4-pentanedione peroxide 4 percent active oxygen.~~

Organic peroxide requirements in the IFC are based on the hazard classification, burning rate and transport type.

Add new text as follows:

E102.1.8.1.1 Hazard classification. Organic peroxide formulations are classified into seven hazard classifications (Detonable, I, IIA, IIB, III, IV and V). These classifications are used to determine the occupancy classifications and maximum allowable quantities. Detonable organic peroxides are explosive. As such, the storage requirements for detonable organic peroxides are found in Chapter 56, and Chapter 62 contains additional use, handling and transfer provisions.

E102.1.8.1.2 Transport types. Organic peroxides are also categorized based on the explosion hazard rating—referred to as the Transport Type. The transport type for organic peroxide formulations is determined in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The explosion hazard levels are divided into “Types” (Type A-G).

E102.1.8.1.3 Burning rate. Organic peroxides are capable of high heat release and large quantities of smoke when they are involved in fire. The burning rate varies for each organic peroxide material and is determined in accordance with PGS 8. The burning rate is calculated from results of large-scale testing or small-scale testing detailed in PGS 8.

E102.1.8.2 Classification process. The classification process for storage and use of organic peroxides is based on the transport type and burning rate as shown in Table E102.1.8.2. For example, a Transport Type C organic peroxide with a burning rate equal to or greater than 300 kilograms (662 pounds) per minute will be treated a Class I organic peroxide; and another Transport Type C organic peroxide with a burning rate less than 140 kilograms (309 pounds) per minute will be treated as a Class IIB organic peroxide.

TABLE E102.1.8.2 STORAGE CLASSIFICATION OF ORGANIC PEROXIDES

TRANSPORT TYPE	BURNING RATE[a]

	Large Scale Test	<10	≥10 and <60	≥60 and <140	≥140 and <300	≥300
	(kg/minute)					
	OR					
	Small Scale Test[b]	NA	<0.9	≥0.9 and <2.2	≥2.2 and <9.0	≥9.0
	(kg/m²/minute)					
B		I	I	I	I	I
C		IIB	IIB	IIB	IIA	I
D		III	III	IIB	IIA	I
E		IV	III	IIB	IIA	IIA
F		IV	III	III	III	III
G		V	V	V	V	V

a. In the absence of burning rate test data, organic peroxides shall be treated as having a burning rate greater than 300 kg/min.

b. Solid materials shall be tested using the large-scale test. Liquid materials can be tested using either the large-scale test or the small-scale test.

E102.1.8.3 Organic peroxide classification.. Examples of organic peroxides and their corresponding classifications are listed in Table E102.1.8.3.

TABLE E102.1.8.3 EXAMPLES OF ORGANIC PEROXIDE STORAGE CLASSIFICATIONS

Organic Peroxide Storage Class	Organic Peroxide Name	CAS#	Formulation Components				
			Concentration (mass%)	Diluent type A	Diluent type B	Inert solid	Water
I	tert-Butyl peroxyacetate	107-71-1	>52-77	≥23			
I	Di-sec-butyl peroxydicarbonate	19910-65-7	>62-100				
I	Di-(4-tert-butylcyclohexyl)peroxydicarbonate	15520-11-3	≤100				
IIA	tert-Amyl peroxy-2-ethylhexyl carbonate	70833-40-8	≤100				
IIA	tert-Butyl peroxyacetate	107-71-1	>32-52	≥48			
IIA	tert-Butyl peroxy-2-ethylhexylcarbonate	34443-12-4	≤100				
IIB	tert-Butyl peroxy-2-ethylhexanoate	3006-82-4	>32-52	≥48			
IIB	tert-Butylperoxy isopropylcarbonate	2372-21-6	≤77	≥23			
IIB	Dilauroyl peroxide	105-74-8	≤100				
III	tert-Butyl hydroperoxide	75-91-2	≤72				≥28
III	Cumyl hydroperoxide	80-15-9	≤80	≥20			
III	Di-tert-butyl peroxide	110-05-4	≤52	≥48			
III	Dicetyl peroxydicarbonate	26322-14-5	≤100				

IV	tert-Butyl peroxyneodecanoate [as a stable dispersion in water]	26748-41-4	≤52	
IV	Di-(4-tert-butylcyclohexyl)peroxydicarbonate [as a stable dispersion in water]	15520-11-3	≤42	
IV	Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water (frozen)]	16111-62-9	≤52	
V	Dibenzoyl peroxide	94-36-0	≤35	≥65
V	Di-(tert-butylperoxyisopropyl) benzene(s)	25155-25-3	≤42	≥58
V	Dicumyl peroxide	80-43-3	≤52	≥48

TABLE E105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	*Standard for Classification of Toxic Mixtures*	E103.1.3.1
CGA P-23—2008	*Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components*	E102.1.2
DOL 29 CFR Part 1910—2023	*Occupational Safety and Health Standards*	E104.1
DOL 29 CFR Part 1910.1200—2012	*Hazard Communication*	E102.1.7.2, E104.1, E104.2
DOTn 49 CFR—2023	*Transportation*	E104.1
DOTn 49 CFR Part 173.127—2005	*Class 5, Division 5.1—Definition and Assignment of Packing Groups*	E102.1.7.2
UN ST/SG/AC.10/11 (Rev. 7)—2019	*Manual of Tests and Criteria*	Table E104.2
UN ST/SG/AC.10/1 (Rev 21)—2019	*Recommendations on the Transport of Dangerous Goods*	Table E104.2
UN ST/SG/AC.10/30 (Rev.7)—2017	*Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards*	E102.1.7.2, E104.1, E104.2, Table E104.2
PGS 8—21	*Organic peroxides: Storage – Guideline for the labour-safe, environment-safe and fire-safe storage of organic peroxides*	E102.1.8.1.3

TABLE F101.2 FIREFIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES

HAZARD CATEGORY	DESIGNATION
Combustible liquid II	F2
Combustible liquid IIIA	F2
Combustible liquid IIIB	F1
Combustible dust	F3 or F2[a]
Combustible fiber	F3
Cryogenic flammable	F4, H3
Cryogenic oxidizing	OX, H3
Explosive	R4
Flammable solid	F2
Flammable gas (gaseous)	F4
Flammable gas (liquefied)	F4
Flammable liquid IA	F4
Flammable liquid IB	F3
Flammable liquid IC	F3
Organic peroxide, ~~UD~~Detonable	R4
Organic peroxide I	F4, R3
Organic peroxide IIA	F3, R3
Organic peroxide IIB	F3, R3
Organic peroxide III	F2, R2
Organic peroxide IV	F1, R1
Organic peroxide V	None
Oxidizing gas (gaseous)	OX
Oxidizing gas (liquefied)	OX
Oxidizer 4	OX4
Oxidizer 3	OX3
Oxidizer 2	OX2
Oxidizer 1	OX1
Pyrophoric gases	F4
Pyrophoric solids, liquids	F3

HAZARD CATEGORY	DESIGNATION
Unstable reactive 4D	R4
Unstable reactive 3D	R4
Unstable reactive 3N	R2
Unstable reactive 2	R2
Unstable reactive 1	None
Water reactive 3	W3
Water reactive 2	W2
Corrosive	H3, COR
Toxic	H3
Highly toxic	H4

a. F3 = Finely divided solids, typically less than 75 micrometers (µm) (200 mesh), that pose an elevated risk of forming an ignitable dust cloud, such as finely divided sulfur, *National Electric Code* Group E dusts (for example, aluminum, zirconium and titanium) and bisphenol A. F2 = Finely divided solids less than 420 µm (40 mesh) that pose an ordinary risk of forming an ignitable dust cloud.

F—Flammable category.

R—Reactive category.

H—Health category.

W—Special hazard: water reactive.

OX—Special hazard: oxidizing properties.

COR—Corrosive.

~~UD—Unclassified detonable material.~~

4D—Class 4 detonable material.

3D—Class 3 detonable material.

3N—Class 3 nondetonable material.

TABLE H102.1 SECTION II—HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) SUMMARY REPORT[a] (Storage[b] Conditions)[c]

IBC/IFC HAZARD CLASS	HAZARD CLASS	INVENTORY AMOUNT			IBC/IFC MAXIMUM ALLOWABLE QUANTITY[d]		
	(Abbrev)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)	Solid (lb)	Liquid (gal)	Gas (cu ft, gal, lb)
Combustible Liquid	C2		5			120	
	C3A					330	
	C3B		6			13,200	
Combustible Fiber	Loose/Baled						
Cryogenics, Flammable	Cryo-Flam					45	
Cryogenic, Oxidizing	Cryo-OX					45	
Flammable Gas	FLG						
(Gaseous)				150			1,000
(Liquefied)						30	
Flammable Liquid	F1A					30	
	F1B & F1C		5			120	
Combination (1A, 1B, 1C)			5			120	
Flammable Solid	FLS				125		
Organic Peroxide	~~OPU~~OPD				~~0~~1		
	OP1				~~5~~16		
	OP2A				~~50~~100		
	OP2B				200		
	OP3				~~125~~400		
	OP4				NL		
	OP5				NL		
Oxidizer	OX4				0		
	OX3				10		
	OX2				250		
	OX1				4,000		

a. Complete a summary report for each *control area* and Group H occupancy.

b. Storage = storage + use-closed + use-open systems.

c. Separate reports are required for use-closed and use-open systems.

d. Include increases for sprinklers or storage in cabinets, if applicable.

(This is an example; add additional hazard classes as needed.)

Add new standard(s) as follows:

PGS

PGS management organization
NEN
Vlinderweg 6
Delft, 2623 AX
Netherlands

8-21 Organic peroxides: Storage -Guidance for the safe storage of organic peroxides.

Reason: F26-24 and F270-24 were heard during CAH 1. Both proposals revised the definition of Organic Peroxide and its subclasses. This Comment to F270-24 removes the Organic Peroxide definitions from F270 and instead a separate Comment to F26-24 proposal is submitted with Organic Peroxide definitions based on both transport type and burning rate. This Comment to F270-24 correlates with Comment to F26-24 and makes F26-24 definition associated changes (Class II to Class IIA and Class IIB split and Unclassified Detonable classification name change to Detonable) throughout Chapter 62, other chapters and appendices, and the IBC. Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references and classification details. The list of organic peroxides examples has been updated to reflect the correct classifications for the organic peroxides listed.

Comment to F26-24 revises Organic Peroxide definitions which includes splitting the current Organic Peroxide Class II into Class IIA and IIB; creating an additional subclassification. The range of the burning rate for the current Class II is quite broad—with a lower limit of 60 kg/min and an upper limit of 300 kg/min. By splitting Class II, it creates Class IIA (burning rate of 140 kg/min to 300 kg/min) and Class IIB (burning rate of 60 kg/min to 140 kg/min). This will provide two I-Code classifications for materials similarly classified by GHS (Type C, D and E) which are then separated by their burning rate into either Class IIA or IIB. This additional classification allows better control of separation distances versus quantity and other features that reflect the burning behavior of the materials, beyond just the explosion hazard represented by the GHS designation. In this proposal, this change from Class II to Class IIA and Class IIB is made throughout Chapter 62, other chapters and appendices, and the IBC. Maximum quantities are defined for Class IIA and IIB where required. Footnote is added under the maximum quantities table in Chapter 62 in a corelated proposal F269 which states that when multiple classes of organic peroxides are stored, the sum of the ratios is used to determine the maximum quantity allowed. So even though the proposal is adding Class IIB quantities, the aggregate of all organic peroxide materials must be considered based on the footnote which is more restrictive than the current code.

Comment to F26-24 also includes Unclassified Detonable classification name change to Detonable. Organic peroxides are classified by transport type A to transport type G. There is no such class called Unclassified Detonable. If an organic peroxide is detonable, then it is classified as transport type A per the UN and DOT organic peroxides definitions. As such, Detonable is an appropriate word to denote such class. In this proposal, this change from Unclassified Detonable to Detonable is made throughout Chapter 62, other chapters and appendices, and the IBC.

Proposals F269-24 and Comment to F270-24 correlate with each other with respect to Chapter 62. While proposal F269-24 makes comprehensive changes to Chapter 62, Comment to F270-24 makes Class II to Class IIA and Class IIB split and Unclassified Detonable class name change to Detonable throughout Chapter 62.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This Comment to F270-24 code proposal makes Class II to Class IIA and Class IIB split and changes Unclassified Detonable classification name to Detonable throughout Chapter 62, other chapters and appendices, and the IBC. Appendix E is revised as part of this code change proposal, which provides the code official and the code user with the details of organic peroxide classification types, basis for classification, test method references and classification details. The list of organic peroxides examples has been updated to reflect the correct classifications for the organic peroxides listed. The information provided in this proposal helps both the code official and the code user to effectively implement the code. The proposal does not impact the cost of construction.

Comment (CAH2)# 498

F276-24

IFC: TABLE E104.2, E104.2, E104.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Lynne Kilpatrick, HMEx Assistant LLC, self (lkilpatrick425@gmail.com)

2024 International Fire Code

Revise as follows:

TABLE E104.2 IFC AND GHS HAZARD DEFINITIONS COMPARISON[a]

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS ~~2017 (REV 7)~~ CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Aerosol	—	A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~1, Level 2 or Level~~ 3, Level 2, or Level 1.	Any nonrefillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.
~~Aerosol~~	~~Level 1~~	~~Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).~~	~~H223, Category 3, Pressurized container: May burst if heated.~~ ~~1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g.~~ ~~2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2.~~

Aerosol	Level 2	These with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 2; Flammable aerosol. Pressurized container: May burst if heated: 1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: a. A heat of combustion of ≥ 20 kJ/g. b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: i. A time equivalent of ≤ 300 s/m^3; or ii. A deflagration density of ≤ 300 g/m^3; or 2. Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.

Aerosol	Level 3	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).	H222, Category 1; Extremely flammable aerosol. Pressurized container: May burst if heated: 1. Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g. 2. Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm. 3. Any aerosol that dispenses a foam that, in the foam flammability test, has: a. A flame height of ≥ 20 cm and a flame duration of ≥ 2 s. b. A flame height of ≥ 4 cm and a flame duration of ≥ 7 s.
Aerosol	Level 2	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	

			H223, Category 2; Flammable aerosol: 1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: a. A heat of combustion of ≥ 20 kJ/g. b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: i. A time equivalent of ≤ 300 s/m^3; or ii. A deflagration density of ≤ 300 g/m^3; or
Aerosol	Level 1	An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 3: 1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion ≥ 20 kJ/g; 2. Any aerosol that dispenses a spray that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s; 2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2. and H229; Pressurized container: May burst if heated and H229; Pressurized container: May burst if heated
Combustible liquid	—	A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93°C.
Combustible liquid	II	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint at or above 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	H226, Category 3; Flammable liquid and vapor: Flash point ≥ 23°C and ≤ 60°C
Combustible liquid	IIIA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 4). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	H227, Category 4; Combustible liquid: Flash point > 60°C and ≤ 93°C
Combustible liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A

Compressed gas	—	A material or mixture of materials that: 1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied (gaseous) or in solution (dissolved), except those gases that have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). COMPRESSED GAS, DISSOLVED. Dissolved compressed gases, or gases in solution, are non-liquefied gases that are dissolved in a solvent. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Dissolved Gas. COMPRESSED GAS, GASEOUS. Gaseous compressed gases are non-liquefied gases, other than those in solution (dissolved), which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Compressed Gas. COMPRESSED GAS, LIQUEFIED. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Liquefied Gas. ~~States of compressed gases:~~ ~~1. Nonliquefied compressed gases are gases, other than those in solution, that are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).~~ ~~2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).~~ ~~3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.~~ ~~4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.~~	Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. H280, Compressed gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). H280, Liquefied gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). H280, Dissolved gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is dissolved in a liquid phase solvent.
Corrosive	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Skin Corrosion (Category 1A, 1B, or 1C), or Serious Eye Damage (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage. Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.
Cryogenic fluid	—	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Cryogenic Fluids are categorized as a Gas Under Pressure – Refrigerated Liquefied Gas. However, not all GHS Refrigerated Liquefied Gases are Cryogenic Fluids.	H281, Refrigerated liquefied gas; Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.

Cryogenic fluid, flammable	—	A cryogenic fluid that is a *flammable gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Flammable Gas, Category 1A or Category 1B and Gases Under Pressure - Refrigerated Liquefied Gas. ~~A cryogenic fluid that is flammable in its vapor state.~~	H220, Category 1A; Extremely flammable gas. Gases, which at 20° C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points, regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases.~~—~~ H281, refrigerated liquefied gas, would also apply
Cryogenic fluid,~~—~~Inert	—	A cryogenic fluid that is an *inert* gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Gases Under Pressure - Refrigerated Liquefied Gas.	H281, Refrigerated liquefied gas. Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.
Cryogenic fluid,~~—~~ Oxidizing	—	~~An oxidizing gas in the cryogenic state.~~A cryogenic fluid that is an *oxidizing gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Oxidizing Gas, Category 1 and Gases Under Pressure - Refrigerated Liquefied Gas.	H270, Category 1: May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H281, refrigerated liquefied gas, would also apply.
Explosives	—	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, Division 1.4G Explosives, by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.
Explosives	Unstable explosives		H200; Unstable explosive. Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.
Explosives	Division 1.1	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.1). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	H201; Explosive; mass explosion hazard. Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).
Explosives	Division 1.2	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.2). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a projection hazard but not a mass explosion hazard.	H202; Explosive; severe projection hazard. Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.
Explosives	Division 1.3	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.3). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	H203; Explosive; fire, blast or projection hazard. Substances, mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: 1. Combustion of which gives rise to considerable radiant heat; or 2. Which burn one after another, producing minor blast or projection effects or both.
Explosives	Division 1.4	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.4). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard; substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN No. 0336 and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A

Explosives	Division 1.5	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.5). Where the GHS category is not known, the following is acceptable for classification purposes: Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	H205; May mass explode in fire. Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.
Explosives	Division 1.6	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.6). Where the GHS category is not known, the following is acceptable for classification purposes: Extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.
Flammable gas	Gaseous or Liquefied	A material that is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows: ~~which:~~ 1. Category 1A. a gas that meets either of the following: 1.1 ~~A gas that is~~ Ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or ~~2.~~ 1.2 ~~Has a~~A flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit, unless data shows compliance with Category 1B. 2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following: 2.1. A lower flammability limit of more than 6 percent by volume of air. 2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s). The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.Where not otherwise specified, the term "flammable gas" includes both Categories 1A and 1B. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Flammable Gases are categorized as a Flammable Gas (Category 1A or 1B).	A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A; Extremely flammable gas. Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. H220, Category 1B; Flammable gas. Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric nor chemically unstable, and which have at least either: 1. A lower flammability limit of more than 6% by volume in air; or 2. A fundamental burning velocity of less than 10 cm/s. ~~H280, compressed gas, would also apply.~~
Flammable liquid	—	A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	A liquid having a flash point of not more than 93°C. A flammable liquid is classified in one of the four categories for this class.
Flammable liquid	IA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	H224, Category 1; Extremely flammable liquid and vapor. Flash point < 23°C and initial boiling point ≤ 35°C
Flammable liquid	IB	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	H225, Category 2; Highly flammable liquid and vapor. Flash point < 23°C and initial boiling point > 35°C
Flammable liquid	IC	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint below 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	H226, Category 3; Flammable liquid and vapor. Flash point ≥ 23°C and ≤ 60°C

Flammable solid	—	A solid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Solid (Category 1 or 2). Where the GHS category is not known, the following is acceptable for classification purposes: A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid, as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, subsection 33.2.1 of the Manual of Tests and Criteria, according to: H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone does not stop fire; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time ≤ 5 min H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone stops the fire for at least 4 min; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min and ≤ 10 min
Highly toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2. Where the GHS category is not known, one of the following is acceptable for classification purposes: ~~A material that produces a lethal dose or lethal concentration that falls within any of the following categories:~~ 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation H330, Category 1; Fatal if inhaled. Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapors: LC50 ≤ 0.5 mg/l (4 hr) ≈ ~~2~~1 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr)
Inert compressed gas	—	A compressed gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert compressed gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20°C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases. See the description of “Compressed gas.”

Organic peroxide	—	Liquid or solid ~~An~~ organic substances ~~compound~~ that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by ~~an~~ organic radicals.The term also includes organic peroxide formulations (mixtures).Organic peroxides ~~can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.~~are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: a. be liable to explosive decomposition; b. burn rapidly; c. be sensitive to impact or friction; d. react dangerously with other substances.	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: 1. Be liable to explosive decomposition. 2. Burn rapidly. 3. Be sensitive to impact or friction. 4. React dangerously with other substances.
Organic peroxide	UD	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes: Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.	H240, Organic peroxide, Type A; Heating may cause an explosion. Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide Type A.
Organic peroxide	I	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that are capable of *deflagration* but not *detonation*.	H241, Organic peroxide, Type B; Heating may cause a fire or explosion. Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly but is liable to undergo a thermal explosion in that package will be defined as organic peroxide Type B.
Organic peroxide	II	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn very rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type C; Heating may cause a fire. Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide Type C. H242, Organic peroxide, Type D; Heating may cause a fire. Any organic peroxide which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide Type D.
Organic peroxide	III	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type E; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide Type E.
Organic peroxide	IV	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	H242, Organic peroxide, Type F; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide Type F.
Organic peroxide	V	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes: ~~Describes t~~Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	Organic peroxide, Type G. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and for liquid mixtures, a diluent having a boiling point of not less than 150°C and used for desensitization will be defined as organic peroxide Type G. If the organic peroxide is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, it shall be defined as organic peroxide Type F.

Oxidizer	—	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
Oxidizer	4	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and which have evidence of explosive properties or are packaged for transport in Packing Group I. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.
Oxidizer	3	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and is not otherwise classified as Class 4. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.
Oxidizer	2	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 2) or Oxidizing Liquids (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	H272, Category 2; May intensify fire; oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 40% aqueous sodium chlorate solution and cellulose and the criteria for Category 1 are not met.

Oxidizer	1	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 3) or Oxidizing Liquids (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that does not moderately increase the burning rate of combustible materials.	H272, Category 3; May intensify fire; oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 65% aqueous nitric acid solution and cellulose and the criteria for Categories 1 and 2 are not met.
Oxidizing gas	Gaseous or Liquefied	A compressed gas that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Oxidizing Gas, Category 1. Where the GHS category is not known, the following is acceptable for classification purposes: A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. ~~H280, compressed gas would also apply.~~
Oxidizing gas	Liquified	An oxidizing gas that is liquefied [liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C)].	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H280, liquefied gas, would also apply.
Pyrophoric	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	Separate definitions based on physical state; see each category of pyrophoric:
Pyrophoric	Solid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A solid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric solid; Catches fire spontaneously if exposed to air. A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The solid ignites within 5 minutes of coming into contact with air.
Pyrophoric	Liquid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A liquid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric liquid; Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes. Testing is performed at 25 ±2°C and 50 ±5% relative humidity.
Pyrophoric	Gas	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A gas with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H220, Category 1A~~, Extremely flammable,~~ Pyrophoric gas. ~~May ignite spontaneously if exposed to air.:~~ A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54°C or below. and H232; May ignite spontaneously if exposed to air ~~H280, compressed (or liquefied) gas, would also apply.~~

Toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4. Where the GHS category is not known, one of the following is acceptable for classification purposes: ~~A chemical falling within any of the following categories:~~ 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist~~, fume~~ or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight Dermal H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight Inhalation H330, Category 2; Fatal if inhaled: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapours: LC50 > 0.5 mg/l (4 hr) ≈ ~~2~~1 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ ~~8~~4 mg/l (1 hr) Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) H331, Category 3; Toxic if inhaled: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapours: LC50 > 2 mg/l (4 hr) ≈ ~~8~~4 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ ~~4~~20 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)
Unstable (reactive)	—	A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor~~, or in the presence of contaminants, or in contact with incompatible materials.~~ Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category A) and can include compressed gases categorized as Chemically Unstable (Type A).	H240, Type A; Heating may cause an explosion. Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance Type A.
Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category B) and can include compressed gases categorized as Chemically Unstable (Type B).	H241, Type B; Heating may cause a fire or explosion. Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance Type B.

Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category C or D).	H242, Type C; Heating may cause a fire. Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance Type C. H242, Type D; Heating may cause a fire. Any self-reactive substance or mixture which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance Type D; Will be defined as self-reactive substance Type D.
Unstable (reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category E or F).	H242, Type E; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance Type E. H242, Type F; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance Type F. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C to 75°C for a 50 kg package), and for liquid mixtures, a diluent having a boiling point greater than or equal to 150°C and used for desensitization will be defined as self-reactive substance Type G. If the mixture is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, the mixture shall be defined as self-reactive substance Type F.

Unstable (reactive) gas	Gaseous		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. H220, Category 1A, Chemically Unstable, Category A; Extremely flammable gas~~; May react explosively even in the absence of air.~~: Flammable gases which are chemically unstable at 20° C and a standard pressure of 101.3 kPa. and H230: May react explosively even in the absence of air or H220, Category 1A, Chemically Unstable, Category B; Extremely flammable gas~~; May react explosively even in the absence of air at elevated pressure and/or temperature.~~: Flammable gases which are chemically unstable at a temperature greater than 20° C and/or a standard pressure greater than 101.3 kPa. and H231: May react explosively even in the absence of air at elevated pressure and/or temperature ~~H280, compressed gas, would also apply.~~
Water reactive	3	Materials that react explosively with water without requiring heat or confinement. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 1).	H260, Category 1; Contact with water releases flammable gases which may ignite spontaneously. Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any 1 minute. (UN/DOT test methods: Test N.5, Part III, subsection 33.4.1.4)
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 2).	H261, Category 2; Contact with water releases flammable gas. Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.
Water reactive	1	Materials that react with water with some release of energy, but not violently. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 3).	H261, Category 3; Contact with water releases flammable gas. Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.

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a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

E104.2 GHS hazardous materials definitions comparison table. Table E104.2 provides a tabular presentation of the various definitions published within the *International Fire Code*. In addition, the table presents corresponding definitions, where available, from the ~~2012 edition of~~ DOL 29 CFR 1910.1200 along with applicable hazard statement codes. DOL 29 CFR 1910.1200 aligns with the UN's *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)*. The table is not meant to imply perfect alignment between IFC and GHS definitions.

E104.1 Hazardous materials definitions. The categorization and classification of hazardous materials enables the code user to determine the applicability of requirements based on hazard category and class related to the physical and health hazards of materials. The ~~current~~ definitions found in Chapter 2 have been developed using criteria found in NFPA codes and standards, model fire prevention

codes, NIOSH, and requirements of the US Department of Transportation (DOTn 49 CFR) and US Department of Labor (DOL 49 CFR 1910).
The chemical industry has grown substantially since the inception of the IFC hazard definitions. Large-scale global production and distribution of common and specialty chemicals has become mainstream. In the 1990s, the United Nations (UN) developed the *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)* to create international congruency among chemical suppliers. The GHS is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials.
The DOL ~~published a~~ revised the *Hazard Communication Standard*(DOL 29 CFR 1910.1200) to align with the GHS ~~in March 2012. It became effective in May 2012.~~ All manufacturers selling, producing or transporting chemicals in the United States are ~~now~~ required to comply with the GHS and provide ~~this~~ standardized hazard information on all Safety Data Sheets (SDS).
SDS are a primary source of information for identifying hazards for chemicals and mixtures containing hazardous materials. It can be helpful for fire code officials to become familiar with the GHS definitions and how they relate to IFC hazard definitions.

Reason:
Fire Code officials must enforce the hazardous materials provisions of the International Fire Code (IFC) and the International Building Code (IBC) to ensure that people and property in our communities are safe. While code officials need to verify and validate the hazards of materials, classifying hazardous materials in accordance with definitions and hazard classes in the I-codes is the responsibility of facility owners which continues to be a challenge. Consequences of missing or incorrect classification include increased fire and life safety risk and can lead to misclassification of an occupancy.

Due to the expansion of international chemical trade, the United Nations (UN) developed a Globally Harmonized System (GHS) of classification of hazardous materials. The GHS is an internationally agreed upon standard of classification and labeling that in most cases utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (29 CFR 1910.1200 (OSHA) and 49 CFR 173.127 (DOT)) mandates that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the information readily available in product Safety Data Sheets (SDSs).

This proposal aims to incorporate the readily available GHS (Revision 7) classifications into the I-code definitions to better align with federal standards for hazardous materials classification. Proper identification of multiple hazards and the degree of hazard are likely outcomes of utilizing the GHS.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This comparison will make compliance more straightforward. In some cases, utilizing GHS definitions may more heavily regulate additional materials for new buildings; conversely, in other cases GHS definitions will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

F276-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The intent of this proposal is appropriate which is to update the Appendix Table dealing with the GHS hazard definition comparisons and was approved based upon the need to keep this proposal available for further revision. However, it was requested that the proponent update these definitions to match the actions taken on the GHS definition proposals. It was also suggested that the definition proposals include this table in each of the associated definitions proposals as a Comment to the committee at CAH#2. (Vote 9-4)

F276-24

Individual Consideration Agenda

Comment 1:

IFC: TABLE E104.2

Proponents: Megan Hall, UC Berkeley Fire Prevention, self (mchall@berkeley.edu); Lynne Kilpatrick, HMEx Assistant LLC, self (lkilpatrick425@gmail.com); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Revise as follows:

TABLE E104.2 IFC AND GHS HAZARD DEFINITIONS COMPARISON[a]

IFC MATERIAL	IFC CLASS	IFC DEFINITION	GHS ~~CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT;~~ HAZARD CLASS, CATEGORY: DEFINITION
Aerosol	—	A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level ~~3, Level 2, or Level 1.~~1, Level 2, or Level 3	Any nonrefillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.
Aerosol	Level 1	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20kJ/g). And, where the heat of combustion is unknown, those classified as Aerosols (Category 3) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).	**Aerosols, Category 3:** 1) Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g; or 2) Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2.

Aerosol	Level 2	Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20kJ/g), but less than or equal to 13,000 Btu/lb (30kJ/g). And, where the heat of combustion is unknown, those classified as Aerosols (Category 2) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).	**Aerosols, Category 2:** 1) Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: (a) a heat of combustion of ≥ 20 kJ/g; (b) a heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or (c) a heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: (i) - a time equivalent of ≤ 300 s/m^3; or (ii) - a deflagration density of ≤ 300 g/m^3; or 2) Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.
Aerosol	Level 3	~~An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes:~~ Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g). And, where the heat of combustion is unknown, those classified as Aerosols (Category 1) under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).	~~H222~~**Aerosols, Category 1**~~; Extremely flammable aerosol. Pressurized container: May burst if heated~~: 1. Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g. 2. Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm. 3. Any aerosol that dispenses a foam that, in the foam flammability test, has: a. A flame height of ≥ 20 cm and a flame duration of ≥ 2 s. b. A flame height of ≥ 4 cm and a flame duration of ≥ 7 s.
~~Aerosol~~	~~Level 2~~	~~An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).~~	

			~~H223, Category 2, Flammable aerosol~~: ~~1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has:~~ ~~a. A heat of combustion of ≥ 20 kJ/g.~~ ~~b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or~~ ~~c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time:~~ ~~i. A time equivalent of ≤ 300 s/m^3; or~~ ~~ii. A deflagration density of ≤ 300 g/m^3; or~~ ~~2. Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.~~ ~~and~~ ~~H229, Pressurized container: May burst if heated~~
~~Aerosol~~	~~Level 1~~	~~An aerosol product that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Aerosol (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).~~	~~H223, Category 3:~~ ~~1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g.~~ ~~2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2.~~ ~~and~~ ~~H229, Pressurized container: May burst if heated~~
Combustible liquid	—	A liquid having a closed cup flash point at or above 100° F (38° C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93° C.

Combustible liquid	II	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint at or above 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	~~H226~~**Flammable liquids, Category 3**~~, Flammable liquid and vapor~~: Flash point ≥ 23°C and ≤ 60°C
Combustible liquid	IIIA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 4). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	~~H227~~**Flammable liquids, Category 4**~~, Combustible liquid~~: Flash point > 60°C and ≤ 93°C
Combustible liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A
Compressed gas	—	A material or mixture of materials that: 1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied (gaseous) or in solution (dissolved), except those gases that have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). COMPRESSED GAS, DISSOLVED. Dissolved compressed gases, or gases in solution, are non-liquefied gases that are dissolved in a solvent. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Dissolved Gas. COMPRESSED GAS, GASEOUS. Gaseous compressed gases are non-liquefied gases, other than those in solution (dissolved), which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Compressed Gas. COMPRESSED GAS, LIQUEFIED. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these gases are categorized as Gases Under Pressure – Liquefied Gas. .	**Gases under pressure** are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. ~~H280~~**Gases under pressure, compressed gas**~~, Contains gas under pressure: May explode if heated.~~: A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). ~~H280~~**Gases under pressure**, **liquefied gas**~~, Contains gas under pressure: May explode if heated.~~: A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). ~~H280~~**Gases under pressure**, **dissolved gas**~~, Contains gas under pressure: May explode if heated.~~: A gas which when under pressure is dissolved in a liquid phase solvent.
Corrosive	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Skin Corrosion (Category 1A, 1B, or 1C), or Serious Eye Damage (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	~~H314~~**Skin corrosion/irritation**, **Category 1 (1A, 1B, 1C)**~~, Causes severe skin burns and eye damage.~~: *Skin corrosion* refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture. **Serious eye damage/eye irritation, Category 1**: *Serious eye damage* refers to the production of tissue damage in the eye, or serious physical decay of vision, which is not fully reversible, occurring after exposure of the eye to the substance or mixture.
Cryogenic fluid	—	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa). Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Cryogenic Fluids are categorized as a Gas Under Pressure – Refrigerated Liquefied Gas. However, not all GHS Refrigerated Liquefied Gases are Cryogenic Fluids.	~~H281~~**Gases under pressure, refrigerated liquefied gas**~~, Contains refrigerated gas~~: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.

Cryogenic fluid, flammable	—	A cryogenic fluid that is a *flammable gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Flammable Gas, Category 1A or Category 1B and Gases Under Pressure - Refrigerated Liquefied Gas.	~~H220~~**Flammable gases, Category 1A**~~, Extremely flammable gas.~~: Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points, regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases, or **Flammable gas, Category 1B**: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric, nor chemically unstable, and which have at least either: (a) a lower flammability limit of more than 6% by volume in air; or (b) (b) a fundamental burning velocity of less than 10 cm/s *and* **Gases under pressure, refrigerated liquefied gas** ~~H281, refrigerated liquefied gas, would also apply~~
Cryogenic fluid,Inert	—	A cryogenic fluid that is an *inert* gas in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Gases Under Pressure - Refrigerated Liquefied Gas.	~~H281~~**Gases under pressure, refrigerated liquefied gas**~~ Contains refrigerated gas: May cause cryogenic burns or injury.~~: A gas which is made partially liquid because of its low temperature.
Cryogenic fluid,Oxidizing	—	A cryogenic fluid that is an *oxidizing gas* in its vapor state. These fluids are categorized under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) as Oxidizing Gas, Category 1 and Gases Under Pressure - Refrigerated Liquefied Gas.	~~H270~~**Oxidizing gases, Category 1**: ~~May cause or intensify fire; oxidizer.~~ Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. *and* **Gases under pressure, refrigerated liquefied gas** ~~H281, refrigerated liquefied gas, would also apply.~~
Explosives	—	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term “Explosive” includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, Division 1.4G Explosives, by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.
Explosives	Unstable explosives		~~H200,~~ **Explosives, Unstable explosive**~~.~~: Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.
Explosives	Division 1.1	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.1). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	~~H201, Explosive; mass explosion hazard.~~**Explosives, Division 1.1:** Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).
Explosives	Division 1.2	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.2). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a projection hazard but not a mass explosion hazard.	~~H202, Explosive; severe projection hazard.~~ **Explosives, Division 1.2:** Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.

Explosives	Division 1.3	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.3). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	~~H203; Explosive; fire, blast or projection hazard.~~**Explosives, Division 1.3:** Substances, mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: 1. Combustion of which gives rise to considerable radiant heat; or 2. Which burn one after another, producing minor blast or projection effects or both.
Explosives	Division 1.4	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.4). Where the GHS category is not known, the following is acceptable for classification purposes: Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	~~H204; Fire or projection hazard.~~ **Explosives, Division 1.4:** ~~Substances, mixtures and articles which present no significant hazard; s~~Substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN No. 0336 and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A
Explosives	Division 1.5	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.5). Where the GHS category is not known, the following is acceptable for classification purposes: Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	~~H205; May mass explode in fire.~~ **Explosives, Division 1.5:** ~~Very insensitive substances or mixtures which have a mass explosion hazard: s~~Substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.
Explosives	Division 1.6	A chemical or item that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Explosive (Division 1.6). Where the GHS category is not known, the following is acceptable for classification purposes: Extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.	**Explosives, Division 1.6:** ~~Extremely insensitive articles which do not have a mass explosion hazard.~~ A~~a~~rticles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.
Flammable gas	Gaseous or Liquefied	A material that is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows: 1. Category 1A. a gas that meets either of the following: 1.1 Ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or 1.2 A flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit, unless data shows compliance with Category 1B. 2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following: 2.1. A lower flammability limit of more than 6 percent by volume of air. 2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s). The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.Where not otherwise specified, the term “flammable gas” includes both Categories 1A and 1B. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Flammable Gases are categorized as a Flammable Gas (Category 1A or 1B).	A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3 kPa. ~~H220~~**Flammable gases, Category 1A**~~; Extremely flammable gas.~~: Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. ~~H220~~**Flammable gases, Category 1B**~~; Flammable gas.~~: Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric nor chemically unstable, and which have at least either: 1. A lower flammability limit of more than 6% by volume in air; or 2. A fundamental burning velocity of less than 10 cm/s.

Flammable liquid	—	A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	A liquid having a flash point of not more than 93°C. A flammable liquid is classified in one of the four categories for this class.
Flammable liquid	IA	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	~~H224~~**Flammable liquids, Category 1**~~, Extremely flammable liquid and vapor.~~; Flash point < 23°C and initial boiling point ≤ 35°C
Flammable liquid	IB	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	~~H225~~**Flammable liquids, Category 2**~~, Highly flammable liquid and vapor.~~; Flash point < 23°C and initial boiling point > 35°C
Flammable liquid	IC	A liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Liquid (Category 3) and having a flashpoint below 100°F (38°C). Where the GHS category is not known, the following is acceptable for classification purposes: Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	~~H226~~**Flammable liquids, Category 3**~~, Flammable liquid and vapor.~~; Flash point ≥ 23°C and ≤ 60°C
Flammable solid	—	A solid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as a Flammable Solid (Category 1 or 2). Where the GHS category is not known, the following is acceptable for classification purposes: A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid, as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, subsection 33.2.1 of the Manual of Tests and Criteria, according to: ~~H228~~**Flammable solids, Category 1**~~, Flammable solid~~: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone does not stop fire; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time ≤ 5 min ~~H228~~**Flammable solids, Category 2**~~, Flammable solid~~: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone stops the fire for at least 4 min; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min and ≤ 10 min

Highly toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as any one of the following GHS Acute Toxicity categories: · Oral Category 1 or 2 · Dermal Category 1 or 2 · Inhalation Gases Category 1 · Inhalation Vapors Category 1 · Inhalation Dusts and Mists Category 1 or 2. ~~Acute Toxicity Oral Category 1 or 2, Dermal Category 1 or 2, Inhalation Gases Category 1, Inhalation Vapors Category 1, or Inhalation Dusts and Mists Category 1 or 2.~~ Where the GHS category is not known, ~~one of the following is acceptable~~ use the following for classification purposes: 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral ~~H300~~**Acute toxicity, Category 1**~~; Fatal if swallowed~~: LD50 ≤ 5 mg/kg bodyweight ~~H300~~**Acute toxicity, Category 2**~~; Fatal if swallowed~~: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal ~~H310~~**Acute toxicity, Category 1**~~; Fatal in contact with skin~~: LD50 ≤ 50 mg/kg bodyweight ~~H310~~**Acute toxicity, Category 2**~~; Fatal in contact with skin~~: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation ~~H330~~**Acute toxicity, Category 1**~~; Fatal if inhaled.~~: Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapors: LC50 ≤ 0.5 mg/l (4 hr) ≈ 1 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) **Acute toxicity, Category 2**: Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)
Inert ~~compressed~~ gas	—	A ~~compressed~~ gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert ~~compressed~~ gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. ~~Some of the more common inert compressed gases include argon, helium, krypton, neon, nitrogen and xenon.~~	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20° C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases. See ~~the description of "~~Compressed gases/Gases under pressure.~~"~~
Organic peroxide	—	Liquid or solid organic substances that contains the bivalent -O-O- structure and ~~which~~ may be considered ~~to be~~ a structural derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals.The term also includes organic peroxide formulations (mixtures). Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time. Organic peroxide classifications used in the International Codes are based on the organic peroxide transport type determined in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and the burning rate of the material. ~~Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:~~ ~~a. be liable to explosive decomposition;~~ ~~b. burn rapidly;~~ ~~c. be sensitive to impact or friction;~~ ~~d. react dangerously with other substances~~.	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: 1. Be liable to explosive decomposition. 2. Burn rapidly. 3. Be sensitive to impact or friction. 4. React dangerously with other substances.
Organic peroxide	~~UD~~ Detonable	Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of ~~Chemicals (GHS) as an Organic Peroxide (Type A). Type A Organic Peroxides are forbidden in transportation. Where the GHS Category is not known, the following is acceptable for classification purposes: Organic peroxides that are capable of *detonation*. These peroxides pose an extremely high explosion hazard through rapid explosive decomposition.~~ Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition. This class is comprised of organic peroxide formulations which are organic peroxide Type A under GHS.	~~H240, Organic peroxides, Type A~~; ~~Heating may cause an explosion.~~: (a) Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide Type A.

Organic peroxide	I	~~Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type B). Where the GHS Category is not known, the following is acceptable for classification purposes: Those~~ Describes those formulations that are capable of *deflagration* but not *detonation*. This class is comprised of organic peroxide formulations which, as packaged, are: 1. Organic peroxide Type B under GHS regardless of the burning rate. 2. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 300 kg/min. 3. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 9.0 kg/(min × m^2) unless the large-scale burning rate is less than 300 kg/min. 4. Organic peroxides of Type C, D, E, F or G under GHS where the burning rate is not known.	~~H241, Organic peroxides, Type B; Heating may cause a fire or explosion.~~; (b) Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly but is liable to undergo a thermal explosion in that package will be defined as organic peroxide Type B. **Organic Peroxides, Type C**: (c) Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide TYPE C; **Organic Peroxides, Type D:** (d) Any organic peroxide which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide TYPE D; **Organic Peroxides, Type E:** (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E; **Organic Peroxides, Type F**: (f) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide TYPE F; **Organic Peroxides, Type G**: (g) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and, for liquid mixtures, a diluent having a boiling point of not less than 150 °C is used for desensitization, will be defined as organic peroxide TYPE G. If the organic peroxide is not thermally stable or a diluent having a boiling point less than 150 °C is used for desensitization, it is defined as organic peroxide TYPE F.

Organic peroxide	IIA	~~Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type C) or (Type D). Where the GHS Category is not known, the following is acceptable for classification purposes: Those~~ Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are: 1. Organic peroxide Type C or D under GHS with a large-scale burning rate equal to or greater than 140 kg/min, but less than 300 kg/min. 2. Organic peroxide Type C or D under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m²), but less than 9.0 kg/(min × m²). 3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 140 kg/min. 4. Organic peroxide Type E under GHS with a small-scale burning rate equal to or greater than 2.2 kg/(min × m²).	~~H242, Organic peroxides, Type C; Heating may cause a fire.;~~ (c) Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide Type C. ~~H242, Organic peroxides, Type D; Heating may cause a fire.;~~ Any organic peroxide which in laboratory testing: (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide Type D. **Organic Peroxides, Type E:** (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E;
Organic peroxide	IIB	Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are: 1. Organic peroxide Type C under GHS with a large-scale burning rate less than 140 kg/min. 2. Organic peroxide Type C under GHS with a small-scale burning rate less than 2.2 kg/(min × m²). 3. Organic peroxide Type D or E under GHS with a large-scale burning rate equal to or greater than 60 kg/min, but less than 140 kg/min. 4. Organic peroxide Type D or E under GHS with a small-scale burning rate equal to or greater than 0.9 kg/(min × m²), but lower than 2.2 kg/(min × m²).	**Organic Peroxides, Type C**: (c) Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide TYPE C; **H242, Organic Peroxides, Type D**: (d) Any organic peroxide which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide TYPE D; **Organic Peroxides, Type E:** (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E;

Organic peroxide	III	~~Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type E). Where the GHS Category is not known, the following is acceptable for classification purposes:~~ ~~Those~~ Describes those formulations that burn rapidly and that pose a moderate reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are: 1. Organic peroxide Type D under GHS with a large-scale burning rate less than 60 kg/min. 2. Organic peroxide Type D under GHS with a small-scale burning rate less than 0.9 kg/(min × m²). 3. Organic peroxide Type E under GHS with a large-scale burning rate equal to or greater than 10 kg/min, but less than 60 kg/min. 4. Organic peroxide Type E under GHS with a small-scale burning rate less than 0.9 kg/(min × m²). 5. Organic peroxide Type F under GHS with a large-scale burning rate equal to or greater than 10 kg/min. 6. Organic peroxide Type F under GHS regardless of the small-scale burning rate.	**Organic Peroxides, Type D:** (d) Any organic peroxide which in laboratory testing: (i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide TYPE D; ~~H242, Organic peroxides, Type E; Heating may cause a fire.~~; (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide Type E. **Organic Peroxides, Type F**: (f) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide TYPE F;
Organic peroxide	IV	~~Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type F). Where the GHS Category is not known, the following is acceptable for classification purposes:~~ ~~Those~~ Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type E or F under GHS with a large-scale burning rate less than 10 kg/min.	**Organic Peroxides, Type E:** (e) Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide TYPE E; ~~H242, Organic peroxides, Type F; Heating may cause a fire.~~; (f) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide Type F.
Organic peroxide	V	~~Any organic peroxide which, as packaged, is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Organic Peroxide (Type G). Where the GHS Category is not known, the following is acceptable for classification purposes:~~ ~~Those~~ Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard. This class is comprised of organic peroxide formulations which, as packaged, are organic peroxide Type G under GHS.	**Organic peroxides, Type G.**: (g) Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and for liquid mixtures, a diluent having a boiling point of not less than 150°C and used for desensitization will be defined as organic peroxide Type G. If the organic peroxide is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, it shall be defined as organic peroxide Type F.
Oxidizer	—	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

Oxidizer	4	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and which have evidence of explosive properties or are packaged for transport in Packing Group I. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	~~H271~~**Oxidizing solids *or* Oxidizing liquids, Category 1**~~; May cause fire or explosion; strong oxidizer.~~: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.
Oxidizer	3	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 1) or Oxidizing Liquids (Category 1) and is not otherwise classified as Class 4. Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	~~H271~~**Oxidizing solids *or* Oxidizing liquids, Category 1**~~; May cause fire or explosion; strong oxidizer.~~: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.
Oxidizer	2	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 2) or Oxidizing Liquids (Category 2). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	~~H272~~**Oxidizing solids *or* Oxidizing liquids, Category 2**~~; May intensify fire; oxidizer.~~: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 40% aqueous sodium chlorate solution and cellulose and the criteria for Category 1 are not met.

Oxidizer	1	A solid or liquid that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as either Oxidizing Solids (Category 3) or Oxidizing Liquids (Category 3). Where the GHS category is not known, the following is acceptable for classification purposes: An oxidizer that does not moderately increase the burning rate of combustible materials.	~~H272~~**Oxidizing solids *or* Oxidizing liquids, Category 3**~~; May intensify fire; oxidizer.~~: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 65% aqueous nitric acid solution and cellulose and the criteria for Categories 1 and 2 are not met.
Oxidizing gas	Gaseous or Liquefied	A compressed gas that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as an Oxidizing Gas, Category 1. Where the GHS category is not known, the following is acceptable for classification purposes: A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. ~~H270~~**Oxidizing gases, Category 1**~~; May cause or intensify fire; oxidizer~~: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.
~~Oxidizing gas~~	~~Liquified~~	~~An oxidizing gas that is liquefied [liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C)].~~	~~Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.~~ ~~H270, Category 1, May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.~~ ~~H280, liquefied gas, would also apply.~~
Pyrophoric	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	*Separate definitions based on physical state; see each category of pyrophoric:*
Pyrophoric	Solid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A solid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	~~H250~~**Pyrophoric solids, Category 1**~~; Pyrophoric solid; Catches fire spontaneously if exposed to air.~~: A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The solid ignites within 5 minutes of coming into contact with air.
Pyrophoric	Liquid	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A liquid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	~~H250~~**Pyrophoric liquids, Category 1**~~; Pyrophoric liquid; Catches fire spontaneously if exposed to air~~: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes. Testing is performed at 25 ±2°C and 50 ±5% relative humidity.

Pyrophoric	Gas	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Pyrophoric Gas, Pyrophoric Solid (Category 1), or Pyrophoric Liquid (Category 1). Where the GHS category is not known, the following is acceptable for classification purposes: A gas with an autoignition temperature in air, at or below a temperature of 130° F (54° C).	~~H220~~**Flammable gases, Category 1A, Pyrophoric gas**~~; Extremely flammable gas. May ignite spontaneously if exposed to air~~: A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54° C or below. ~~and~~ ~~H232; May ignite spontaneously if exposed to air~~
Toxic	—	A substance or mixture that is categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as any one of the following GHS Acute Toxicity categories: · Oral Category 3 · Dermal Category 3 · Inhalation Gases Category 2 · Inhalation Gases Category 3 and having an LC50 ≤1,000 ppm (4 hour exposure) · Inhalation Vapors Category 2 · Inhalation Vapors Category 3 and having an LC50 ≤4 mg/l (4 hour exposure) · Inhalation Dusts and Mists Category 3 or 4 ~~Acute Toxicity Oral Category 3 or 4, Dermal Category 3, Inhalation Gases Category 2 or 3, Inhalation Vapors Category 2 or 3, or Inhalation Dusts and Mists Category 3 or 4.~~ Where the GHS category is not known, ~~one of the following is acceptable~~ use the followingfor classification purposes: 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than ~~500~~ 300 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	*Acute toxicity* refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral ~~H301~~**Acute toxicity, Category 3**~~, Toxic if swallowed~~: LD50 > 50 ≤ 300 mg/kg bodyweight ~~H302, Category 4, Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight~~ Dermal ~~H311~~**Acute toxicity, Category 3**~~, Toxic in contact with skin~~: LD50 > 200 ≤ 1,000 mg/kg bodyweight Inhalation ~~H330~~**Acute toxicity**, **Category 2**~~, Fatal if inhaled~~: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapo~~ur~~rs: LC50 > 0.5 mg/l (4 hr) ≈ 1 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 4 mg/l (1 hr) ~~Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr)~~ ~~H331~~**Acute toxicity, Category 3**~~, Toxic if inhaled~~: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapo~~ur~~rs: LC50 > 2 mg/l (4 hr) ≈ 4 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 20 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr) **Acute toxicity, Category 4**: Dust/mist: LC50 > 1 mg/l (4 hr) ≈ 4 mg/l (1 hr) ≤ 5 mg/l (4 hr) ≈ 20 mg/l (1 hr)
Unstable (reactive)	—	A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor. Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category A) and can include compressed gases categorized as Chemically Unstable (Type A).	~~H240~~**Self-reactive substances and mixtures, Type A**~~; Heating may cause an explosion.~~: (a) Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance Type A.

Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category B) and can include compressed gases categorized as Chemically Unstable (Type B).	~~H241~~**Self-reactive substances and mixtures, Type B**~~; Heating may cause a fire or explosion.~~: (b) Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance Type B.
Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category C or D).	~~H242~~**Self-reactive substances and mixtures, Type C**~~; Heating may cause a fire.~~: (c) Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance Type C. ~~H242~~**Self-reactive substances and mixtures, Type D**~~; Heating may cause a fire.~~: (d) Any self-reactive substance or mixture which in laboratory testing: (i) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or (ii) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or (iii) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance Type D; Will be defined as self-reactive substance Type D.
Unstable (reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures. This Class includes liquid or solid materials that are categorized under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as Self-Reactive (Category E or F).	~~H242~~**Self-reactive substances and mixtures, Type E**~~; Heating may cause a fire.~~: (e) Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance Type E. ~~H242~~**Self-reactive substances and mixtures, Type F**~~; Heating may cause a fire.~~: (f) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance Type F. (g) Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C to 75°C for a 50 kg package), and for liquid mixtures, a diluent having a boiling point greater than or equal to 150°C and used for desensitization will be defined as self-reactive substance Type G. If the mixture is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, the mixture shall be defined as self-reactive substance Type F.

Unstable (reactive) gas	Gaseous		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. ~~H220~~**Flammable gases, Category 1A, Chemically unstable, Category A~~; Extremely flammable gas~~: Flammable gases which are chemically unstable at 20° C and a standard pressure of 101.3 kPa. ~~and~~ ~~H230: May react explosively even in the absence of air~~ or ~~H220~~**Flammable gases, Category 1A, Chemically unstable, Category B~~; Extremely flammable gas~~: Flammable gases which are chemically unstable at a temperature greater than 20° C and/or a standard pressure greater than 101.3 kPa. ~~and~~ ~~H231: May react explosively even in the absence of air at elevated pressure and/or temperature~~
Water reactive	3	Materials that react explosively with water without requiring heat or confinement. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 1).	~~H260~~**Substances and mixtures, which in contact with water, emit flammable gases, Category 1~~; Contact with water releases flammable gases which may ignite spontaneously.~~:** Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any 1 minute. (UN/DOT test methods: Test N.5, Part III, subsection 33.4.1.4)
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 2).	~~H261~~**Substances and mixtures, which in contact with water, emit flammable gases, Category 2~~; Contact with water releases flammable gas.~~:** Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.
Water reactive	1	Materials that react with water with some release of energy, but not violently. Under the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), these are classified as substances or mixtures which, in contact with water, emit flammable gases (Category 3).	~~H261~~**Substances and mixtures, which in contact with water, emit flammable gases, Category 3~~; Contact with water releases flammable gas.~~:** Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.

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a. The table illustrates that there is not perfect alignment between the IFC and GHS definitions and provides information on similarities and difference between the two classification systems.

Reason: Proposed changes align with GHS but also are amended to reflect Committee's request for updates to proposals which were disapproved. Changes reflect CAH2 comments/modifications for 3 proposals that were disapproved in CAH1 (Aerosols, Toxic/Highly Toxic, Inert gases) and Organic peroxides after discussions with industry. There is also an update to how GHS Hazard classifications are presented (last column) to better align with what is reflected on Safety Data Sheets.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is meant to provide correlation with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) which is used globally and by OSHA. This comparison will make compliance more straightforward. In some cases, utilizing GHS definitions may more heavily regulate additional materials for new buildings; conversely, in other cases GHS definitions will result in reduced classification of materials. However, any differences are balanced out by the coordination and ease of enforcement that comes with being aligned with GHS and OSHA. US manufacturers and distributors of hazardous materials have been required to use the GHS classification system to communicate the hazards of materials in Safety Data Sheets (SDS) since 2012.

Attached Files

- **Table E104.2_IFC vs GHS_2027_06.28.2024.pdf**
  https://www.cdpaccess.com/comment/291/32047/files/download/7872/

Comment (CAH2)# 291

F280-24

IFC: APPENDIX P (New), (New), SECTION P101 (New), P101.1 (New), P101.2 (New), SECTION 202 (New), P101.3 (New), SECTION P102 (New), P102.1 (New), P102.2 (New), P102.3 (New), P102.3.1 (New), P102.3.2 (New), P102.4 (New), P102.5 (New), P102.6 (New), P102.7 (New), P102.8 (New), P102.9 (New), P102.10 (New), SECTION P103 (New), P103.1 (New), P103.2 (New), SECTION P104 (New), P104.1 (New), P104.2 (New), P104.3 (New), P104.4 (New), SECTION P105 (New), P105.1 (New), P105.2 (New), P105.3 (New), SECTION P106 (New), P106.1 (New), P106.1.1 (New), P106.2 (New), SECTION P107 (New), P107.1 (New), SECTION P108 (New), E108.1 (New), TABLE P108.1 (New)

Proposed Change as Submitted

Proponents: Jeffrey Shapiro, International Code Consultants, Lake Travis Fire Rescue (jshapiro@LTFR.org)

2024 International Fire Code

Add new text as follows:

APPENDIX P
SHORT-TERM RESIDENTIAL RENTAL SAFETY PROGRAM

N/A. *The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.*

About this appendix: This appendix prescribes minimum safeguards for life-safety to protect *transient* occupants of a s*hort-term rental property*. It is intended for distribution to a *responsible party* to highlight select requirements of the International Fire Code and International Property Maintenance Code plus prescribe additional requirements that are uniquely applicable to *short-term rental properties.*

SECTION P101
GENERAL

P101.1 Scope. *Dwelling units, sleeping units*, and portions thereof classified as a *short-term rental property* shall comply with this appendix.

P101.2 Definitions. For the purpose of this appendix, certain terms are defined as follows:

Add new definition as follows:

RESPONSIBLE PARTY. An *owner* or manager operating a *short-term rental* property.

SHORT-TERM RENTAL PROPERTY. A *dwelling unit*, *sleeping unit*, or portion thereof providing one or more *sleeping spaces*, made available for temporary occupancy, whether rented or swapped, for a period of 30 days or less.

SLEEPING SPACE. A bedroom or other location intended to provide sleeping accommodations.

Add new text as follows:

P101.3 Permit. A permit shall be required for each short-term rental property. Where two or more sleeping rooms are available for separate rental or exchange in a single *dwelling unit* or *sleeping unit*, only one permit for the *dwelling unit* or *sleeping unit* shall be required. A permit application shall be accompanied by a floor plan that identifies every *sleeping space* and a copy of the safety plan required by this appendix.

SECTION P102
GENERAL SAFETY FEATURES AND PRECAUTIONS

P102.1 General. *Short-term rental properties* shall comply with Sections P102.2 through P102.10.

P102.2 Permissible locations. *Short-term rental properties* shall be located in buildings that were constructed with an *approved* building code and are maintained in accordance with the International Property Maintenance Code. **Exception:** The *fire code official* is authorized to accept *short-term rental properties* of a different type where justified in accordance with Section 104.2.3 or 104.2.4.

P102.3 Smoke alarms. *Smoke alarms* shall be installed and maintained in accordance with Section 907.2.11.

P102.3.1 Additional smoke alarms. Where a *sleeping space* would otherwise not require a *smoke alarm* based on the requirements of 907.2.11, a *smoke alarm* shall be installed in such space.

P102.3.2 Replacement. If a smoke alarm stops functioning or is more than 10-years old, based on the date marked on the back of the device, or if there is no marked date, such smoke alarm shall be replaced.

P102.4 Carbon monoxide alarms. Carbon monoxide alarms shall be provided and maintained in accordance with Section 915.

P102.5 Portable Fire extinguishers. A minimum of one portable fire extinguisher with a minimum rating of 2-A:10-B:C shall be provided on each story of a *short-term rental unit*, secured on a mounting bracket in a conspicuous and unobstructed location along a normal path of travel.

P102.6 Fire protection system maintenance. *Fire alarm systems* and *automatic sprinkler systems*, where provided, shall be inspected, tested, and maintained operational in accordance with this code.

P102.7 Electrical safety. Use of current taps, relocatable power taps and extension cords shall be in a safe manner and that complies with Sections 603.5 and 603.6.

P102.8 Portable heater safety. Portable heaters shall be listed and labeled and shall be located not less than 3 feet (914 mm) from any combustible material. Portable electric heaters shall be plugged directly into a permanent receptacle. Portable fuel-fired heaters shall not be placed in a *sleeping space* or within 5 feet (1524 mm) of an exit.

P102.9 Outdoor cooking. Outdoor cooking shall not be conducted on combustible balconies or decks or within 10 feet (3048 mm) of combustible construction.

P102.10 Clothes dryer maintenance. The lint trap, mechanical and heating components, and the exhaust duct system of clothes dryers shall be maintained free of lint accumulation.

SECTION P103
OCCUPANCY AND USE LIMITS

P103.1 Overcrowding. The number of occupants in a *short-term rental property* shall not exceed the limits established by Section 404 of the International Property Maintenance Code.

P103.2 Prohibited sleeping spaces. Kitchens and non-habitable spaces shall not be used as *sleeping spaces*.

SECTION P104
MEANS OF EGRESS AND ESCAPE

P104.1 Minimum access. Where more than one *sleeping space* is located in a *dwelling unit* or *sleeping unit*, a *sleeping space* shall not constitute the only means of access to other *sleeping spaces* or *habitable spaces* and shall not serve as the only means of egress from other *habitable spaces*.

P104.2 Exit identification. Where the egress path to an exit is not readily apparent, photoluminescent exit signs shall be installed to clearly mark the egress path.

P104.3 Emergency escape and rescue opening. Each *sleeping space* shall have an *emergency escape and rescue opening* that complies with the code that was in effect at the time of construction, and openings shall be maintained such that they are operational from the inside without the use of keys or tools. Where bars, grilles, grates or similar devices are placed over an *emergency escape and rescue opening*, the minimum net clear opening size that complies with the code that was in effect at the time of construction shall be maintained.

P104.4 Escape ladders. Where a *sleeping space* is located more than one *story* above *grade plane*, an emergency escape ladder complying with ASTM F2175 shall be provided at not less than one *emergency escape and rescue opening* on each such story.

SECTION P105
SAFETY PLAN

P105.1 General. The *responsible party* shall prepare, implement, and maintain a written safety plan for each *short-term rental property*.

P105.2 Approval. The safety plan shall be submitted to the *Fire Code Official* and *approved* before a permit is issued.

P105.3 Safety plan elements. *Short-term rental property* safety plans shall include the following:

1. Name and contact information of *responsible party*.
2. The procedure for a transient occupant to report an emergency and the means of communicating that procedure to transient occupants.
3. A graphic illustration of the full floor plan of the *dwelling unit* or *sleeping unit* with a *short-term rental property* that includes the following:
   - 3.1. The location of each *sleeping space*.
   - 3.2. Two escape paths for each *sleeping space*, including the path to the nearest outside exit door and to a designated *emergency escape and rescue opening* for the *sleeping space*.
   - 3.3. The location of *portable fire extinguishers*, *smoke alarms*, *carbon monoxide alarms*, and emergency escape ladders if provided.
4. Safety equipment records, including the following:
   - 4.1. Location and manufacturing date of each *smoke alarm*, as marked on the back of the alarm.
   - 4.2. Location and manufacturing date of each *carbon monoxide alarm*, as marked on the back of the alarm.
5. Location of fuel-fired equipment and *appliances*.

SECTION P106
FIRE SAFETY INSPECTIONS

P106.1 Responsible party inspections. The *responsible party* shall complete a monthly fire safety inspection of the *short-term rental property* to verify compliance with this appendix. All indoor and outdoor areas associated with the *short-term rental property* shall be

inspected.

P106.1.1 Inspection of automatic sprinkler systems. Inspection of automatic sprinkler systems, where provided, shall include the following on a monthly basis unless otherwise indicated:

1. Control valves shall be verified as being in the open position.
2. Leaking, damaged, corroded, or painted sprinklers shall be replaced.
3. Decorations or other materials obstructing sprinkler discharge or attached to sprinklers shall be removed.
4. Water tanks or other stored water sources, if present, shall be verified as full.
5. Instruction signs and tags shall be installed near the main valve.
6. The owner's manual for the system shall be onsite.
7. Water pumps, if present, shall be tested annually to confirm proper operation.
8. Waterflow devices that initiate alarms, if present, shall be tested annually to confirm proper operation.

P106.2 Official inspections. Where required by the *fire code official*, an annual inspection by the *fire code official* or an approved third-party inspector shall be conducted at the *responsible party's* expense to verify compliance with this appendix. The results of each inspection shall be documented and maintained at the *short-term rental property* in a conspicuous location for transient occupants to review.

SECTION P107
VIOLATIONS

P107.1 General. Failure to comply with this appendix shall constitute an unlawful act in accordance with Section 113.1 and shall result in the issuance of a notice of violation to the short-term rental owner in accordance with Section 113.3.

SECTION P108
REFERENCED STANDARDS

E108.1 General. See Table P108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE P108.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F2175-2015	Standard Specification for Portable and Permanent Emergency Escape Ladders for Residential Use	P104.4

Reason: Regulation of short-term rental (STR) properties is largely done by a patchwork of jurisdiction-by-jurisdiction requirements with little consistency from what I've found. My focus in submitting this proposal is gaining a level of consistency and education of STR owners and operators via a understandable consolidation of the "most important" safety requirements in ICC codes. Although the ICC codes, such as the IFC and IEBC, include a large number of safety-related provisions that are applicable to STRs (and served as the basis for much of the appendix content), they are currently dispersed in a way that does not promote understanding or compliance by people who don't live in the code world. "Most important" reflects my personal opinion of code requirements that I felt were appropriate to include/duplicate/reference in the new appendix to have the greatest impact on improving safety (primarily fire safety) if understood and followed by responsible parties. Certainly, others may have different perspectives, and hopefully the framework provided by the proposed appendix can be further populated as needed to address considerations raised by others during the code development

process.

Some additional requirements, that are not otherwise provided for by current codes and seem appropriate for regulation of STRs, are also included in the proposal. These include, among others, as escape ladders for second story sleeping areas, declaration of sleeping spaces, and requiring that sleeping spaces are treated as bedrooms even though such spaces in a STR might be repurposed common areas that wouldn't have previously been considered or regulated as a bedroom.

It's important to note that while fires are not known to be frequent in STRs, they have resulted in significant life loss. Also note that the content of this appendix deliberately sidesteps some of the most controversial issues surrounding regulation of STRs by a jurisdiction, particularly nuisance complaints related to noise, parking and trash; neighborhood STR density limits; licensing; and collection of fees/lodging taxes.

Although I serve as a consultant to the National Fire Sprinkler Association, and while this proposal includes regulations that affect sprinklers, this proposal was not reviewed or endorsed by NFSA. And, I am not representing NFSA on this issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Actually, the proposal is not entirely editorial, but it should have no impact on the cost of construction because, for the most part, it simply consolidates/duplicates a selection of existing ICC code requirements into a single location. That's not to say that there wouldn't be costs associated with upgrading an otherwise non-compliant STR property or the required administrative oversight or safety feature additions, but these are not construction costs.

F280-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: SLEEPING SPACE.A bedroom or other location in a short-term rental designated in the permit application as a space that will be offered for overnight occupancy ~~intended to provide sleeping accommodations~~.

P102.5 Portable Fire extinguishers. A minimum of one portable fire extinguisher with a minimum rating of 1~~2~~ A:10-B:C shall be provided on each story of a *short-term rental unit* and as required by Section P102.9, secured on a mounting bracket in a conspicuous and unobstructed location along a normal path of travel.

P102.9 Outdoor cooking.
A 1A:10BC fire extinguisher and appliance operating instructions shall be located within 10 feet of outdoor cooking appliances.
~~Outdoor cooking shall not be conducted on combustible balconies or decks or within 10 feet (3048 mm) of combustible construction.~~

P103.2 Prohibited sleeping spaces. Kitchens,
and rooms or areas not designated on the permit application and *approved* for use as a *sleeping space*, ~~non-habitable spaces~~ shall not be used as *sleeping spaces*.

P104.4 Escape ladders. Where a *sleeping space* is located more than one *story* above *grade plane*, an emergency escape ladder ~~complying with ASTM F2175~~ shall be provided at not less than one *emergency escape and rescue opening* on each such story.

Exception: An emergency escape ladder is not required for stories that have two or more means of egress.

P106.2 Official inspections. Where required by the *fire code official*, an annual inspection
~~by the *fire code official* or an approved third-party inspector~~ shall be conducted ~~at the *responsible party's* expense~~ to verify compliance

with this appendix. The results of each inspection shall be documented and maintained at the *short-term rental property* in a conspicuous location for transient occupants to review.

~~**SECTION P108**~~
~~**REFERENCED STANDARDS**~~

~~**P108.1 General.** See Table P108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.~~
~~**TABLE P108.1 REFERENCED STANDARDS**~~

~~STANDARD ACRONYM~~	~~STANDARD NAME~~	~~SECTIONS HEREIN REFERENCED~~
~~ASTM F2175-2015~~	~~Standard Specification for Portable and Permanent Emergency Escape Ladders for Residential Use~~	~~P104.4~~

Committee Reason: This proposal provides a concise set of requirements appropriately located within an Appendix. This will provide for more consistency for fire safety and enforcement. This will also avoid state legislatures taking on the issue and instead will leave control in the hands of the regulators.
The modifications are associated with providing clarification on intent.

- **Sleeping Space and locations.** The definition of sleeping space is revised to more specifically address the areas where overnight occupancy sleeping will be permitted. This may include a living or family room in addition to the traditional bedrooms, for example. Likewise, Section P103.2 it is clarified as to what areas are prohibited from allowing sleeping within the short-term rental unit.
- **Fire extinguishers.** The fire extinguisher requirements have been changed to require a smaller extinguisher. Additionally extinguishers are now required within 10 feet of outdoor cooking appliances. Many short term rental units have grills or similar appliance where the occupant may not be familiar with operation which increases the risk of fire.
- **Emergency escape ladder.** Section P104.4 simply requires that the escape ladder be provided without a specific reference to the standard. In addition, if there are at least 2 means of egress from a story such ladders are unnecessary. With the deletion of the reference to the ASTM F2175 standard Section P108 is no longer necessary and is deleted.
- **Inspections.** Section P106.2 is revised to remove the requirement for a third party inspection. An annual inspection would still be required.

(Vote 13/0)

F280-24

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202, P101.3, P102.2, P102.3, P102.3.1 (New), P102.3.2 (New), P102.3.1, P102.3.2, P102.5, P104.1, P104.2, P104.3, P104.4, P105.1, P105.4 (New), P106.1, P106.1.1, P106.2

Proponents: Jeffrey Shapiro, Lake Travis Fire Rescue, Lake Travis Fire Rescue (jshapiro@ltfr.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Fire Code

Revise as follows:

SHORT-TERM RENTAL PROPERTY.
A *dwelling unit, sleeping unit*, or portion thereof providing one or more *sleeping spaces*, made available for ~~temporary~~ transient overnight occupancy, whether rented or swapped, for a period of 30 or fewer days ~~or less~~.

P101.3 Permit. A permit shall be required for each short-term rental property. Where two or more *sleeping spaces* ~~rooms~~ are available for separate rental or exchange in a single *dwelling unit* or *sleeping unit*, only one permit for the *dwelling unit* or *sleeping unit* shall be required. A permit application shall be accompanied by a floor plan that identifies every *sleeping space* and a copy of the safety plan required by this appendix.

Revise as follows:

P102.2 Permissible locations. *Short-term rental properties* shall only be located in dwelling units or sleeping units in buildings that are legally in existence for residential use ~~were constructed with an *approved* building code~~ and are maintained in accordance with the

International Property Maintenance Code.

Exception: The *fire code official* is authorized to accept other *short-term rental properties* ~~of a different type~~ where justified in accordance with Section 104.2.3 or 104.2.4.

P102.3 Smoke alarms. *Smoke alarms* shall be installed and maintained in accordance with Section 907.2.11~~.~~ except as provided by Sections P102.3.1 through 102.3.4.

Add new text as follows:

P102.3.1 Interconnection. Where more than one smoke alarm is required to be installed within an individual *dwelling* or *sleeping unit*, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where *listed* wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all *sleeping spaces* over background noise levels with all intervening doors closed.

P102.3.2 Power Source. Smoke alarms shall be powered in accordance with Section 1103.8.2.

Revise as follows:

P102.3.3~~1~~ Additional smoke alarms. Where a *sleeping space* would otherwise not require a *smoke alarm* based on the requirements of 907.2.11, a *smoke alarm* shall be installed in such space.

P102.3.4~~2~~ Replacement. If a smoke alarm stops functioning or is more than 10-years old, based on the date marked on the back of the device, or if there is no marked date, such smoke alarm shall be replaced.

P102.5 Portable Fire extinguishers. A minimum of one portable fire extinguisher with a minimum rating of 1-A:10-B:C shall be provided on each story of a *dwelling unit* or *sleeping unit* being used as a *short-term rental property* ~~*unit*~~ and as required by Section P102.9, secured on a mounting bracket in a conspicuous and unobstructed location along a normal path of travel.

P104.1 Minimum access. *Sleeping spaces* shall have unrestricted access to both a *means of egress* and where required by Section 104.3, at least one *approved emergency escape and rescue opening.* Escape paths within a *dwelling unit* or *sleeping unit* used as a *short-term rental property* shall not include any intervening lockable doors or other obstructions that are not controlled by occupants of the *short-term rental property.*

~~Where more than one *sleeping space* is located in a *dwelling unit* or *sleeping unit*, a *sleeping space* shall not constitute the only means of access to other *sleeping spaces* or *habitable spaces* and shall not serve as the only means of egress from other *habitable spaces*.~~

P104.2 Exit identification. Where the egress path to an exit in a *dwelling unit* or *sleeping unit* used as a *short-term rental property* is not readily apparent, photoluminescent exit signs shall be installed to clearly mark the egress path in the *dwelling unit* or *sleeping unit*.

P104.3 Emergency escape and rescue opening. Each *sleeping space* shall have an *emergency escape and rescue opening* that complies with the requirements of the code that was in effect at the time of construction applicable to bedrooms, and such openings, where required, shall be maintained ~~such that they are~~ operational from the inside without the use of keys or tools. Where bars, grilles, grates or similar devices are placed over an *emergency escape and rescue opening*, the minimum net clear opening size that complies with the code that was in effect at the time of construction shall be maintained.

Revise as follows:

P104.4 Escape ladders. Where a *sleeping space* in a *dwelling unit* or *sleeping unit* used as a *short-term rental property* is located more than one *story* above *grade plane*, an emergency escape ladder shall be provided at not less than one *emergency escape and rescue opening* on each such story.

Exception: An emergency escape ladder is not required for stories that have two or more means of egress.

P105.1 General. The *responsible party* shall prepare, implement, and maintain a written safety plan for each *dwelling unit* or *sleeping unit* used as a *short-term rental property*.

Add new text as follows:

P105.4 Emergency card. An emergency card shall be permanently or semi-permanently mounted in a conspicuous and central location within *dwelling units* and *sleeping units* used as *short-term rental properties*. The information included on the card shall include all of the following:

1. Phone number to call in the event of an emergency
2. Property address
3. Floor plan designating beds in *sleeping spaces* consistent with those shown on the permit application; location of exits; location of emergency escape and rescue openings, where provided; and location of portable fire extinguishers

Revise as follows:

P106.1 Responsible party inspections. The *responsible party* shall complete a monthly fire safety inspection of ~~the~~*dwelling units or sleeping units* used as *short-term rental property* to verify compliance with this appendix. All indoor and outdoor areas associated with the *dwelling unit or sleeping unit* used as a *short-term rental property* shall be inspected.

P106.1.1 Inspection of automatic sprinkler systems. Inspection of automatic sprinkler systems in a *dwelling unit* or *sleeping unit,* where provided, shall include the following on a monthly basis unless otherwise indicated:

1. Control valves in the *dwelling unit* or *sleeping unit* shall be verified as being in the open position.
2. Leaking, damaged, corroded, or painted sprinklers in a *dwelling unit* or *sleeping unit* shall be replaced.
3. Decorations or other materials obstructing sprinkler discharge or attached to sprinklers in a *dwelling unit* or *sleeping unit* shall be removed.
4. Water tanks or other stored water sources, if present in a *dwelling unit* or *sleeping unit* , shall be verified as full.
5. Instruction signs and tags in a *dwelling unit* or *sleeping unit* shall be installed near the main valve.
6. The owner's manual for the system in a *dwelling unit* or *sleeping unit* shall be onsite.
7. Water pumps, if present in a *dwelling unit* or *sleeping unit*, shall be tested annually to confirm proper operation.
8. Waterflow devices that initiate alarms, if present in a *dwelling unit* or *sleeping unit*, shall be tested annually to confirm proper operation.

P106.2 Official inspections. Where required by the *fire code official*, an annual inspection shall be conducted to verify compliance with this appendix. The results of each inspection shall be documented and maintained at the *dwelling unit or sleeping unit* used as a *short-term rental property* in a conspicuous location for transient occupants to review.

Reason:

1. The revisions to the definition of Short-term Rental Property clarify that the term, and thereby the appendix, does not apply to daytime only rentals, such as those properties that might rent a pool/cabana or other space for partial days. The intent is assuring that the appendix isn't applied to rental properties that are rented for monthly or longer periods, given that occupants will certainly become familiar with these properties similar to a primary residence. It is noted that the IBC definition of Transient is correlated to short-term rental, with both specifying 30-days or less as the qualifier. It was previously suggested that the definition be modified to specify that the 30-day trigger should be consecutive days, but this was determined to be unnecessary since any property available for less than 30-days, consecutive or otherwise, is encompassed within the intended application of the appendix.
2. Revisions to P101.3 are a clarification of intent, by using the defined term.

3. Revisions to P102.2 clarify that buildings built prior to the existence of a building code can contain a STR if they are legally in existence for residential use. Buildings built after a building code has been adopted would have to comply with the code governing construction/updates to be legally in existence. The addition of dwelling units or sleeping units clarifies that the entire building doesn't need to be viewed as a STR, vs. only the dwelling unit or sleeping unit being rented.
4. Revisions to P102.3 relax requirements for smoke alarm interconnection. Interconnection text is sourced from 1103.8.2 but does not recognize the Chapter 11 exceptions, recognizing the existence of wireless interconnect devices that are no readily available and relatively inexpensive as an alternative to hard-wiring interconnection in existing structures.
5. Revisions to P102.5 clarify that the portable fire extinguisher only applies to dwelling units and sleeping units, not potentially areas of much larger buildings such as condominiums or apartments that might contain STR units.
6. Revisions to P104.1 improve on the original proposal by better ensuring availability of emergency escape routes. This does not negate separate applicability of IPMC Section 404.4.2, where adopted, which was the basis of the original text. Instead, the revised text better suits short-term rental situations.
7. Revisions to P104.2 clarify that the exit identification requirements only apply to dwelling units and sleeping units, not potentially areas of much larger buildings such as condominiums or apartments that might contain STR units.
8. Revisions to P104.3 clarify that the referenced EERO requirements are those that relate to bedrooms. Although this is pretty clear in the I-codes that require(d) EEROs, the clarification was requested here. In addition, "where required" has been included since there are some cases where EEROs are not required, particularly in some buildings equipped with automatic sprinkler systems.
9. Revisions to P104.4 clarify that the escape ladder requirements only apply to dwelling units and sleeping units, not potentially areas of much larger buildings such as condominiums or apartments that might contain STR units.
10. Revisions to P105.1 clarify that the safety plan requirements only apply to dwelling units and sleeping units, not potentially areas of much larger buildings such as condominiums or apartments that might contain STR units.
11. The new P105.4 adds the additional safety feature of a posted emergency information card that is readily seen by occupants who might not read any of the other information provided by the host in a binder or otherwise. This includes the minimum information that any STR occupant should be familiar with before spending the night.
12. Revisions to P106 clarify that the inspection requirements only apply to dwelling units and sleeping units, not potentially areas of much larger buildings such as condominiums or apartments that might contain STR units.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Reduced requirements will technically reduce cost, but the financial consequences are expected to be negligible. Changes generally clarify the original intent of the proposal but are not purely editorial.

Estimated Immediate Cost Impact Justification (methodology and variables):

Common sense.

Comment (CAH2)# 709

Comment 2:

Proponents: Ricky Cortez, Poconos VRO, Self requests Disapproved

Reason: I urge you to vote against the adoption of Proposal F280-24.Lack of Data

Proposal F280-24 lacks sufficient data to support stricter restrictions on short-term rentals compared to other occupancy groups, such as hotels. The current proposal is based on anecdotal evidence, which does not provide a solid foundation for implementing widespread adoption.

Conflicting Data

Data from the National Fire Protection Association indicates a decrease in overall house fires, including the years when STRs have

occupied a significant number of houses. This raises the question of whether additional restrictions are necessary when fire safety incidents are on the decline.

Burdensome Requirements

Communities are already struggling with burdensome requirements imposed by local authorities, and this proposal may further exacerbate those challenges. It gives the impression that the motive behind the proposed code change is financial gain rather than addressing a specific problem.

Impact on Our Community

The Pocono Mountains are a major draw for visitors, and our thriving vacation rental industry plays a vital role in supporting the local economy. PVRO members are committed to being good neighbors and providing well-maintained, quality homes that enhance the value and vitality of our communities. The additional requirements proposed by F280-24 could discourage hosts from operating STRs, thereby reducing the availability of vacation rentals and adversely affecting tourism and local businesses.

2024 Economic Impact Study: Economic Impact -

https://poconosvro.wildapricot.org/Economic-Impact

- Over 35,000 jobs are derived from our tourism industry
- $4.5 billion in visitor spending come from our tourists
- 38% of STR owners rely on the income from their rentals

As a Host

The health and safety of our guests is paramount. Our success as a business depends on providing a safe place to stay and offering our guests the advice, warnings, and equipment necessary to ensure a pleasant and favorable experience. Efforts to define a standard of care that would improve upon what we, as experienced hosts with designations like SuperHost or top-tier star ratings, already strive for will not be as effective as our current practices.

I operate in a municipality with a defined Short-Term Rental Ordinance that outlines legal standards. There are existing building codes and municipal ordinances relating to health and safety. I have insurance that bases rates on the risks of my operation, and I list my property on booking sites that compile guest experiences and present them to future guests. When my guests state publicly that my vacation rental has "everything," I believe they are correct. When my guests request additional amenities, I provide them. No regulation is better than the free market, and no universal standards can provide better coverage than what I offer and what our local regulators and political processes have put in place. One size does not fit all; imposing a base-level of health and safety is an unnecessary burden for my business and those I compete with.

Additionally, the use of the home is not changing and will continue to be a single-family residence. It is not a commercial space. It is unnecessary for a residential home to need escape ladders in bedrooms and photoluminescent exit signage. The same land usage applies with capacity and occupancy limits. If these changes apply to our vacation homes, they would also have to apply to residential homes used as vacation homes and full-time residences without any capacity or occupancy restrictions.

Host's Personal Story

To help committee members understand the real-world implications of the proposed code modifications, I'd like to share my personal story and experiences as a Host. Hosting has positively impacted my life, my community, and the guests I've welcomed.

I have been a host on Airbnb for 7 years, and have welcomed over 700 families into our community. I take immense pride in prioritizing the safety and well-being of my guests. Throughout my hosting journey, I have diligently maintained my space to create a safe and accessible environment. I'm proud to share that in all my years of hosting, I have not had a single incident related to a fire or any safety concern.

I have taken proactive steps to ensure safety, including the use of interconnected smoke/CO detectors, fire extinguishers, and other life-safety and monitoring devices. I regularly maintain these devices to ensure they are always up to date.As a host, I am not alone in relying on my short-term rental to make ends meet. In fact, 65% of Hosts say they plan to use money they've earned on Airbnb to cover the

heightened costs of living over the next 12 months. Thanks to the income from Airbnb, I have been able to cover basic needs like food and utilities, pay my mortgage, pay my medical bills, and save for retirement.

Our Request

We urge the International Code Council to reconsider Proposal F280-24 and instead work with local governments and industry stakeholders to develop more balanced and practical safety measures. By doing so, we can ensure the safety of guests without imposing unnecessary hardships on hosts who are already meeting existing local standards.

Conclusion

In conclusion, while we recognize the importance of safety in short-term rentals, Proposal F280-24 is an overreach that could harm both hosts and the communities they serve.

Thank you for your time and consideration.

All the best,

Ricky Cortez
Executive Director
Poconos Association of Vacation Rental Owners (PVRO)
info@PoconosVRO.org
www.PoconosVRO.org
(570) 212-9299

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Poconos VRO - STR Impact Report.pdf**
  https://www.cdpaccess.com/comment/371/32101/files/download/7888/

Comment (CAH2)# 371

Comment 3:

Proponents: Elizabeth Deterra, STR Owner (edeterra129@gmail.com) requests Disapproved

Reason: I urge you to vote against the adoption of Proposal F280-24. Proposal F280-24 lacks sufficient data to support stricter restrictions on short-term rentals compared to other occupancy groups, such as hotels. The current proposal is based on anecdotal evidence, which does not provide a solid foundation for implementing widespread adoption.

Data from the National Fire Protection Association indicates a decrease in overall houses, including the years when STRs have occupied a significant number of houses. This raises the question of whether additional restrictions are necessary when safety incidents are on the decline.

Communities are already struggling with burdensome requirements imposed by local authorities, and this proposal may further exacerbate those challenges. It gives the impression that the motive behind the proposed code change is financial gain rather than addressing a specific problem.

My sister and I have been a host on Airbnb for 3 years, and welcomed 60+ guests into our home. We take immense pride in prioritizing the safety and well-being of our guests. Throughout our hosting journey, we have diligently maintained our space to create a safe and accessible environment. We are

proud to share that in all our years of hosting, we have not had a single incident related to any safety concern.

Steps we have taken, include the use of smoke/CO detectors, extinguishers, and other life-safety devices, and the methods used to ensure maintenance is up to date.

As hosts, we are not alone in relying on my short-term rental to make ends meet. In fact, 65% of Hosts say they plan to use money they've earned on Airbnb to cover the heightened costs of living over the next 12 months. Thanks to the income from Airbnb we have been able to cover basic needs like food and utilities, pay our property taxes, pay medical bills, and save for retirement.

Our airbnb has worked to maintain safety and a superhost status that includes a clean environment and safe place to stay. We are responsible for maintaining a safe property for ourselves as well as our neighbors. Again, I urge you to vote against the adoption of Proposal F280-24.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 271

Comment 4:

Proponents: Michael Gnade, myself (mike.gnade@gmail.com) requests Disapproved

Reason: As a small business owner and student of Economics, I urge you to vote against the adoption of Proposal F280-24. Proposal F280-24 lacks sufficient data to support stricter restrictions on short-term rentals compared to other occupancy groups, such as hotels. The current proposal is based on anecdotal evidence, which does not provide a solid foundation for implementing widespread adoption. It additionally targets small business owners in an economic landscape that favors big businesses and hotel chains.

Furthermore, the data we do have conflicts with the anecdotal evidence presented. Data from the National Fire Protection Association indicates a decrease in overall house fires, including the years when STRs have occupied a significant number of houses. This raises the question of whether additional restrictions are necessary when fire safety incidents are on the decline.

I can tell you that my local township and HOA have imposed additional restrictions in my community and all it has done is led to litigation against the township and HOA, decreased home values, and increased HOA dues. Please don't make the same mistake and vote against this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 353

Comment 5:

Proponents: Tom Jaleski, Jensen Hughes, AirBnB requests Disapproved

Reason: The code change proposal for an appendix to the International Fire Code seems to have a purpose in trying to provide code wide guidance on an issue that many jurisdictions are working through, but the proposal as modified seems to not be quite ready for the code. A couple of items that need clarification:

- Short Term Rentals (STRs) can occur in a wide variety of buildings; homes, in apartments, condos; which are not treated the same by the code. This appendix for anything other than single-family residences, does not consider the sprinklers in multi-family buildings, or the other aspects of the buildings required by code.
- NFPA reports on home fires show that the vast majority of fires start in the kitchens. Placing any restriction on grill devices seems to

address a concern that has not been documented as a hazard. Since most homes are of wood construction, a setback restriction would likely not allow grilling at all, since building setbacks, except possibly in the front, would not allow outdoor cooking. Not allowing an activity without documentation of being a hazard is not a basis for code.

- Permitting can place an overburden on some jurisdictions. The house has already been permitted. Most of the time a business permit application already alerts the jurisdiction of the house being used as an STR, that can be enough. Emergency response do not know when a call comes in if the house is being rented of used by the owner, so does it possibly being known as an STR change their procedures?
- Escape ladders can be more hazardous than they may provide safety. These are not required in homes and the escape ladders can provide a means for a hazard when used not in an emergency situation, do not change the firefighter response to bedroom windows, and would likely be deemed to scary to be used even in an emergency. Inclined, fixed ladders are scary enough and are the source of many falls. The installation of an escape ladder seems to create more hazard that it may alleviate.
- In some localities, inspections by AHJs do not have a right to enter the house. Even some local laws on STRs do not override this restriction. The modification making it the homeowner responsibility to verify smoke detectors, CO detectors, and fire extinguishers are all operational is the best procedure.

I understand the need for guidance of requirements for STRs, I also see that placing too many restrictions on homeowners would not be followed, could result in more unknown STRs, and could adversely impact localities who appreciate and respect the financial and cultural impacts of STRs. The industry already has many safety protocols in place to be a part of their network, because it is in their best interest to have safe locations for people to rent. Any restrictions beyond having homeowners understand their responsibility to keep their smoke and CO detectors operational, and their fire extinguishers charged and placed on each floor; is simply based on fear and hearsay rather than documentation.

I support the CAH#1 modified proposal as guidance in an appendix, with the exception of the escape ladders.

Thank you

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 560

Comment 6:

Proponents: Kathryn Levassiur, Airbnb (levassiurk@gmail.com) requests Disapproved

Reason: Dear ICC Committee,
I am pleased to have the opportunity to provide comments against agenda item F280-24. The proposed regulations seem too burdensome and onerous. Data from the National Fire Protection Association has not increased in fire events on properties rented as short term rentals, even though the number of STR properties has increased significantly in the past 9 years.

I use 9 years, because I have been renting my home short term since 2015. Even before I hosted my very first guests, I instinctively made sure my home in Huntington Beach, CA was safe for guests with CO2 and smoke alarms and routinely checking them, lighted walkways, maintaining everything in top working order.

My city has STR regulations, including onsite inspections, fire extinguisher in marked closets, escape route, insurance with specific STR coverage. My home is single level, but if I had a multi level home, I would insure safe exit of my guests on upper floors. I know a lot of hosts, as a volunteer Airbnb Community Leader, as an Airbnb Superhost Ambassador, as founder and head of Huntington Beach STR Alliance, I've encountered thousands of STR stakeholders and not one did not have guest safety at the top of mind. Our homes are our biggest investments and we don't want to lose them because of overlooked safety issues.

My husband and I depend on out STR income to pay property taxes, homeowners insurance, medical insurance, food. We can't afford to go out and adding additional regulations will surely increase our permit fees to operate our short term rentals in CA and FL, which a

scary proposition for us.

We started out as private room hosts in Huntington Beach, then added a private entrance for our space and rent out the rest of the "entire" home on Airbnb. We're seniors and we downsized in our own home. We're thrilled about it! We also spend part of our time in FL to be with family and have another home there with an attached "apartment" that we list on Airbnb. Our homes are never empty, always utilized with listing them on Airbnb. In closing, thank you for your consideration to my opposition of F280-24.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 287

Comment 7:

Proponents: Julie Marks, VERMONT SHORT TERM RENTAL ALLIANCE, Self (director@vtstra.org) requests Disapproved

Reason: The short-term rental of one's vacation home is no different than the long-term rental of any residential property. The safety requirements for rental units must be treated in parody regardless of the rental period being 1 night, 1 month, or 1 year. Mandating safety features that protect short-term renters and not long-term renters is unjust and unreasonable. Residential rentals are not commercial properties. They offer no public areas, have no on-site staff, and do not accommodate parties unknown to one another. Vacation rental homes are residential and ought to be regulated as such. Excessive and cost-prohibitive requirements, such as fixed egress ladders and sprinkler systems, encourage noncompliance. Safety features should be accessible to all operators, regardless of wealth, and should be given allowable variances when other, nonprescribed solutions that reasonably meet the same purpose can be applied.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 346

Comment 8:

Proponents: Amy Monett, Self requests Disapproved

Reason: My name is Amy Monett, I live in Baton Rouge, LA, I have been an Airbnb host for 1 year and 3 months, I have 80 5 star ratings, my small apartment is in the top 1% of listings on the Airbnb app, and I urge you to vote against the adoption of Proposal F280-24. My property, which is attached to my home, has smoke and CO2 detectors installed, has fire extinguishers readily available and has never had any saftey incidents. Along with many other hosts, I treat my guests' space as part of my home and in doing so, make it as safe as my own home.

In addition to being a host, I am also a Co-Leader of the East Baton Rouge Area Airbnb Host Community Group. We are over 200 members strong and discuss safety and liability issues regularly. I've not yet met a host in our area that does not want the utmost safety in their rentals for both their guests and protection of their property. It is in all of our best interests for our families and guests that we provide safe spaces and we strive to do so, without the oversight of local or national entities.

Being involved with Airbnb and having a short term rental has made my life, and the lives of many others, better in SO many ways. Personally, my rental helps keep us in our home by offsetting our mortgage and insurance costs. It also affords me the opportunity to meet so many people from around the world and in my community. As a community group, we also volunteer in our area. Just last week we spent a Saturday morning working at the Baton Rouge Food Bank. In addition, we have had guests from as far away as Venice, Italy, and others who live nearby but need a place to stay while visiting family. Airbnb has opened opportunities for so many by helping people

share their homes with others for a fee. Isn't this how boarding houses used to be? Family run, warm and friendly, and at resonable cost?

So many communities are already struggling with burdensome requirements imposed by local authorities and this proposal may further exacerbate those challenges. It gives the impression that the motive behind the proposed code change is financial gain. I know that if I had to pursue additional inspections and related fees, it would likely not make sense financially for us to rent out our small space any longer.

Please vote against the adoption of proposal F280-24 - for me and for all of the other short term hosts out there who are truly shairng their safe homes with others.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 507

Comment 9:

Proponents: Heidy Seoenz, Self (heidy@seoenz.com) requests Disapproved

Reason: As a dedicated advocate for the El Paso short term rental community, I urge you to oppose the adoption of Proposal F280-24. This proposal seeks to impose restrictive regulations on short term rentals, which would have detrimental effects on both property owners and the local economy.

Having worked tirelessly to promote the benefits of short term rentals in El Paso through my advocacy work with El Paso Short Term Rental Advocates (elpasostra.org), I have witnessed firsthand the positive impact that these rentals have on our community. They provide valuable income opportunities for property owners, support local businesses, and contribute to the vibrant tourism industry in our city.

Proposal F280-24, however, threatens to stifle this growth and innovation by imposing onerous restrictions that would limit the ability of property owners to operate their rentals effectively. By imposing arbitrary limits on occupancy, parking, safety measures and other aspects of short term rental operations, this proposal would unfairly penalize responsible property owners and hinder the economic potential of our community.

Through the education programs we have in our alliance we have implemented courses and checklist that all hosts must use of smoke/CO detectors (interconnected, if applicable), fire extinguishers, and other life-safety devices, and the methods used to ensure maintenance is up to date. We follow all this guidelines through our insurance policies as well.

As a passionate advocate and throughout my hosting journey, I have diligently maintained my space to create a safe and accessible environment, which includes an outdoor grill/sofa bed in my living room. I'm proud to share that in all my years of hosting, I have not had a single incident related to a fire or any safety concern. We follow our occupancy regulations from the city to not allow more than the allowed amount of guests.

I have been hosting on Airbnb for 7 years and I have welcomed 5,000 guests since I started. I take immense pride in prioritizing the safety and wellbeing of my guests. Through out the years I have also decided to teach others how to host on airbnb and following the best practices as a good neighbor (seoenz.com).

As an advocate for my city, I'm not alone in relying on my short-term rental to make ends meet. In fact, 65% of Hosts say they plan to use money they've earned on Airbnb to cover the heightened costs of living over the next 12 months. Thanks to the income from Airbnb I have been able to cover basic needs like food and utilities, pay my mortgage, pay my daughter's tuition, and save for retirement. Specifically to El Paso Tx, 90% of the hosts are mom and pop that only have one airbnb and use this money to pay for our high property taxes (we have the 2nd highest property tax in the nation). They rely immensely on the income to be able to not depend on their children.

Many of our hosts are military, retirees, and empty nesters that take safety seriously.

Communities are already struggling with burdensome requirements imposed by local authorities, and this proposal may further exacerbate those challenges. It gives the impression that the motive behind the proposed code change is financial gain rather than addressing a specific problem. Let us not hinder progress and innovation, but rather embrace the opportunities that short term rentals bring to our community.

Bibliography: Heidy Seoenz
El Paso Short Term Rental Alliance - President
El Paso Chamber of Commerce Governmental Affairs
Airbnb Community Leader Volunteer
heidy@seoenz.com | (915) 316-9263

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 574

Comment 10:

Proponents: Adoram Shemesh, self requests Disapproved

Reason: Hello -- I urge you to vote against the adoption of Proposal F280-24.
Proposal F280-24 lacks sufficient data to support stricter restrictions on short-term rentals compared to other occupancy groups, such as hotels. The current proposal is based on anecdotal evidence, which does not provide a solid foundation for implementing widespread adoption. i have been a host on Airbnb for 5 years, and welcomed multiple guests into my places. we take immense pride in prioritizing the safety and well-being of our guests.
As a host, I am not alone in relying on my short-term rental to make ends meet. In fact, 65% of Hosts say they plan to use money they've earned on Airbnb to cover the heightened costs of living over the next 12 months.
Thank you for considering to vote against the adoption of Proposal F280-24.Adoram Shemesh

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 521

Comment 11:

Proponents: Kara Shure, Airbnb, Inc. requests Disapproved

Reason: Airbnb Comment re: F280-24 As Modified by Committee (CAH2)

July 3, 2024

Airbnb appreciates the opportunity to provide our comment and express our support for common sense regulations that protect the safety of short-term rental guests and the homes of short-term rental Hosts. As a trusted and reliable partner for local authorities and the communities in which we operate, Airbnb has made significant investments in strengthening our policies and technology to prioritize the safety of our community.

These include:

- Our Trust and Safety Advisory Coalition, comprised of global experts, including the International Association of Fire Chiefs, which advises us on our platform policies, employee training and education for our community.
- A program to send free smoke/CO detectors to Airbnb Hosts around the world.
- Our Neighborhood Support Line, which enables neighbors to speak directly to us with urgent concerns about a nearby listing.
- Our 24-hour Safety Line allows Hosts and guests to directly reach our specialized Safety team for help during an active stay.
- Home safety workshops in collaboration with hosts and local fire services.
- The creation of a first-of-its-kind law enforcement portal, which helps us support law enforcement investigations globally.

In addition to these ongoing efforts to enhance safety, Airbnb recognizes the importance of engaging with organizations like the International Code Council to continually improve safety standards. We value the opportunity to contribute to the discussions and collaborate on best practices that promote the safety and well-being of our community.

Support of CAH1 Modifications from Orlando

We appreciate several modifications proposed and approved at the Committee Action Hearing in Orlando this April. These modifications demonstrate careful thought and provide helpful guidance on fire extinguishers and smoke and carbon monoxide detectors.

- **Outdoor cooking**
  We endorse the proposed modification (MP6) stipulating the placement of fire extinguishers near outdoor cooking appliances. We urge the Committee to avoid placing further restrictions that could prohibit outdoor cooking on decks or balconies. Barbecues and grills are commonly enjoyed amenities in vacation rentals, and imposing limitations in the absence of data suggesting a specific problem (compared to other homes) would be inappropriate.

Opposition to Certain Provisions

- **Escape ladders**
  We believe that, as applied in this Appendix, emergency escape ladders would provide minimal safety improvement. Moreover, we are unaware of any data supporting the need for these devices – which are not required in other residential rentals – in short-term rentals (see footnote below). In fact, indiscriminate use of escape ladders can introduce additional hazards if not employed correctly and may be more dangerous than remaining in place and awaiting proper rescue.

Conclusion

In conclusion, Airbnb supports common sense fire safety regulations, including many of the components of Proposal F280-24 as modified by the committee (CAH2). As the Council continues its deliberations, we urge it to consider whether there is sufficient evidentiary reasoning to justify code changes at this time.

Through collaboration with industry experts, local authorities, and our community, Airbnb continually evaluates and enhances our safety protocols to maintain the highest standards and to foster a culture of safety and responsibility. To that end, we appreciate the opportunity to provide our perspective to the members of the ICC.

Sincerely,

Andrew Kalloch

Director, Policy Development

Airbnb

(1) Recent reports from the National Fire Protection Association have found that the population-based fire rates continued to decline after Airbnb's founding (2008). See: https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/fire-loss-in-the-united-states (2023).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Airbnb Comment - ICC _ F280-24.pdf**
  https://www.cdpaccess.com/comment/476/32250/files/download/7908/

Comment 12:

Proponents: Lisa Sievers, Lewis Sievers Properties LLC, Lewis Sievers Properties LLC (lisa@lisasievers.com) requests Disapproved

Reason: Hello - I respectfully ask you to vote against the adoption of Proposal F280-24 regarding short-term rentals. The requirements will only only pile on yet more ordinance-based requirements for cities that have short-term rentals. We already are subjected to far more safety, code and other burdensome and costly requirements than standard long term rental property and homes and this proposal would only add more red tape and expense.

As an owner of two short-term rentals, I can assure you that we have had zero safety issues. We have a smoke detector and fire extinguisher in both of our short-term rentals. I would like to know if there is data showing that short-term rentals have a greater risk of fire than a long term rental property or a home. It is my understanding that this has never been an issue and in fact fire incidents are on the decline.

Additionally, as a leading member of the Dallas Short-term Rental Alliance, I would again ask you to vote against this proposal. To repeat, it is difficult enough to jump through the extensive amount of hoops that the city requires of us to register and operate. Adding another layer of bureaucracy on top of will cause additional time delays and expense for cities and frustration for short-term rental owner/operators.

Thank you for your consideration. Happy to discuss further. Lisa Sievers 214 597 4030

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment 13:

Proponents: Shane Simenstad, Safe Kids Worldwide, Safe Kids Worldwide, Public Policy Manager requests Disapproved

Reason: Thank you for this opportunity to provide comment on Proposal F280-24, which would modify the International Fire Code (IFC) by adding a new Appendix P covering short-term residential dwellings. As a non-profit organization dedicated to preventing unintentional child injuries, including those resulting from fire and burns, we support the development of safety standards addressing this emerging and growing space. However, we have questions as to whether certain elements of F280-24, as proposed, may create burdensome requirements for short-term rental hosts without providing a significant safety benefit.

Sleeping Space Definition
The Section P101 definition of a “sleeping space” is broad enough to potentially include floors, sofas, and couches. Should a living room sofa or floor be classified in such a way, this would appear to create a conflict with the minimum access requirements described in P104.1.

Outdoor Cooking
Section P102.9, covering outdoor cooking on balconies or decks, would include, under its restriction, one or two-family dwelling units which, we understand, are exempted for outdoor fireplaces and gas grills under 2024 IFC 307.4.3 and 308.1.6 respectively. Including these exceptions here, along with requirements that grills be CSA certified and fire extinguishers be kept nearby, would seem to balance fire protection with code consistency.

Fire Safety Inspections
P106.2 would require annual compliance inspections for this code by a fire code official or approved third-party inspector, a burden not required for other similar residential occupancies in this code. We are curious as to what data demonstrates the safety benefit provided by such a requirement, as opposed to requiring that such properties be made immediately available for inspection by a fire code official without notice.

Safe Kids Worldwide is a grassroots organization dedicated to preventing unintentional child injuries, the leading cause of death for kids in the United States. Our network acts through education & awareness, community programming and policy advocacy to address these injuries at their root causes and build an equitable, sustainable culture of safety. As part of our strategic plan, we are focused on including equity in all we do. This shift is in response to systemic, persistent disparities in child safety. We envision a world where children grow up healthy and safe from unintentional injuries regardless of their background.

We thank you again for the opportunity to comment on this proposal and for your commitment to safety.

Sincerely,

Safe Kids Worldwide

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 418

Comment 14:

Proponents: Carl Vidal, Self requests Disapproved

Reason: Carl Vidal
4224 Vista De Paseo RD NW
Albuquerque, NM 87120
7/1/24
International Code Council

Dear Members of the ICC Committee,

I urge you to vote against the adoption of Proposal F280-24. This proposal lacks sufficient data to support stricter restrictions on short-term rentals compared to other occupancy groups, such as hotels. The current proposal is based on anecdotal evidence, which does not provide a solid foundation for implementing widespread adoption.

Data from the National Fire Protection Association indicates a decrease in overall house fires, including the years when short-term rentals (STRs) have occupied a significant number of houses. This raises the question of whether additional restrictions are necessary when fire safety incidents are on the decline.

Furthermore, communities are already struggling with burdensome requirements imposed by local authorities, and this proposal may further exacerbate those challenges. It gives the impression that the motive behind the proposed code change is financial gain rather than addressing a specific problem.

I have been a host for short-term rentals that I both own and operate as a licensed realtor property manager for eight years, welcoming over 5,000 guests into our homes. I take immense pride in prioritizing the safety and well-being of my guests. I'm proud to share that in all my years of hosting, I have not had a single incident related to a fire or any safety concern.

As a host, I am not alone in relying on my short-term rentals to make ends meet. In fact, 65% of hosts say they plan to use the money they've earned on Airbnb to cover the heightened costs of living over the next 12 months. Thanks to the income from Airbnb, I have been

able to cover basic needs like food and utilities, pay my mortgage, pay my medical bills, and save for retirement.

Additionally, I am the author of the New Mexico short-term rental economic impact study, where 14,000 rentals in NM produced over $1 billion in economic impact, 14,555 jobs, and $82 million in taxes (https://irviehomes.com/economic-impact-studies). Short-term rentals are vital to our community and need to operate without burdensome regulations that will put many owners and property managers out of work.

Short-term rentals provide an invaluable service by offering flexible, affordable, and diverse accommodation options. They cater to families, business travelers, and tourists, contributing significantly to local economies. The proposed restrictions could undermine this crucial sector, leading to a loss of income for thousands of hosts and reduced tourism revenue for cities and towns.

I appreciate your time and consideration in this matter. Please prioritize fair and reasonable regulations for short-term rentals that support both hosts and guests while ensuring community safety.

Sincerely,

Carl Vidal

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **2023 New Mexico Short Term Economic Impact Study.pdf**
  https://www.cdpaccess.com/comment/355/32075/files/download/7884/

Comment (CAH2)# 355

Comment 15:

Proponents: Eugenie "Jean" Young, Long Beach Airbnb Hosting Club (visitbeautifullongbeach@gmail.com) requests Disapproved

Reason: July 2, 2024
International Code Council
200 Massachusetts Ave, NW
Suite 250, Washington, DC 20001

Dear ICC Members,

I am writing this letter to encourage you to vote against the adoption of Proposal F280-24. This proposal lacks the evidence needed to support the recommendations put forth here.

In November 2014, I wrote my first letter to Long Beach city staff encouraging study, community input, and recognition in the city code that short-term rentals exist and are workable. After much time and input from hosts, community groups and neighbors alike, by May 2020, we had a strong ordinance. It ensures that short term rentals in Long Beach are regulated, sets a cap on the number of unhosted units, requires exit signage, a fire extinguisher, smoke detectors, and a 24-hour point of contact.

A bit about my personal story. I've been a resident of Long Beach for 30 years. As a divorcee and freelancer, I evened out income ups and downs by taking in Airbnb guests to supplement my income.

Since discovering Airbnb in 2013, I have hosted guests from five continents. Overwhelmingly, the experience has been positive. I encourage my guests to explore and shop locally -- and they always do! Many of my guests meet locals during their stay to obtain a deeper, richer experience of Long Beach. I highlight the best restaurants, beaches, shopping experiences, and sports and entertainment venues Long Beach has to offer.

The money I generate from home sharing allows me to maintain my home and pay property taxes and cover expenses with the ever-increasing cost of living in Southern California. Culturally and economically, the exchange has been vibrant and healthy -- for my guests, for me, and for the city. Short term rentals circulate roughly $15 million a year in trickle down spending to the local Long Beach economy. This does not include direct spending by guests, or the collection of a hotel bed tax, which generates about $3M a year for the city. I also employ two cleaners, who live in Long Beach, and have enabled them to boost their standard of living thanks to income from short-term rental cleaning fees.
I pride myself on keeping a beautiful, tranquil -- and safe – environment. I have an outdoor grill and a sofa bed in my living room. I have a fire extinguisher in the kitchen, and smoke/CO2 detectors in each room of my home. I am happy to say that in my 13 years hosting, I have not had an incident related to fire or safety.

If effectively managed, short-term rentals of residences help homeowners hold on to their residences and invest in upkeep, which can support neighborhood stability and vitality.
The reality in Long Beach is that 80% of hosts earn modest extra income and have just one listing. Hosts want to be responsible and operate in accordance with the law.

The 2028 Olympics will be here before we know it, bringing athletes and tourism to Long Beach. We are all looking forward to future tourism, which is such an important revenue generator for our city. We are vigilant in ensuring the health and safety of our short-term renters because we want to protect them and our property, but we do not feel that additional, burdensome requirements, are needed to address problems we do not have.
Sincerely,

Jean Young
Leadership Team
Long Beach Hosting Club
visitbeautifullongbeach@gmail.com
562-857-2427

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 423

FS2-24

IBC: 703.2.1.3

Proposed Change as Submitted

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Steve Skalko, Stephen V. Skalko, P.E. & Associates LLC, Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Building Code

Revise as follows:

703.2.1.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. Restrained construction shall be identified on the *construction documents*. **Exception:** Unless otherwise determined by the *registered design professional*, concrete girders, beams, and slabs connected to structural concrete framing or structural concrete walls in accordance with ACI 318 shall be considered restrained. Restrained concrete construction shall be identified on the *construction documents*.

Reason: This code change proposal does not alter the technical requirements of the code. The exception is simply to avoid sending the Registered Design Professional (RDP) to ASTM E119 to discover that all concrete connections designed in accordance with ACI 318 restrain movement relative to the supporting structural members. This is consistent with the classification described in ASM E119 Standard Test Methods for Fire Tests of Building Construction and Materials. Appendix X3 Guide for Determining Condition of Restrain for Floor and Roof Assemblies and for Individual Beams of ASTM E119 advises that concrete framing is to be considered restrained for:

(1) Beams fastened to the framing members,

(2) All types of concrete cast-in-place floor or roof construction (such as beam-and-slabs, flat slabs, pan joists, and waffle slabs) where the floor or roof construction is cast with the framing members

(3) Interior and exterior spans of precast construction with cast-in-place joints resulting in restraint equivalent to that which would exist in condition (1).

(4) All types of prefabricated floor or roof construction where the structural members are secured to such construction.

The minimum structural integrity requirements of ACI 318 are such that horizontal structural concrete elements are required to have connections restraining movement relative to the supporting structural member. ACI 318 Table 4.10.2.1 – Minimum requirements for structural integrity based on member type directs the RDP to the appropriate structural integrity sections of ACI 318:

Nonprestressed one-way cast-in-place slabs – 7.7.7

Nonprestressed two-way slabs – 8.7.4.2

Prestressed two-way slabs – 8.7.5.6

Nonprestresssed two-way joint systems – 8.8.1.6

Cast-in-place beam – 9.7.7

Nonprestressed one-way joint system – 9.8.1.6

Precast joint and connection – 16.2.1.8

For those interested in the minimum structural integrity requirements of ACI 318, they are as follows:

Nonprestressed one-way cast-in-place slabs

7.7.7 *Structural integrity reinforcement in cast-in-place one-way slabs*

7.7.7.1 Longitudinal structural integrity reinforcement consisting of at least one-quarter of the maximum positive moment reinforcement shall be continuous.

7.7.7.2 Longitudinal structural integrity reinforcement at noncontinuous supports shall be anchored to develop f_y at the face of the support.

7.7.7.3 If splices are necessary in continuous structural integrity reinforcement, the reinforcement shall be spliced near supports. Splices shall be mechanical or welded in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2.

Nonprestressed two-way slabs

8.7.4.2 *Structural integrity*

8.7.4.2.1 All bottom deformed bars or deformed wires within the column strip, in each direction, shall be continuous or spliced using mechanical or welded splices in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2. Splices shall be located in accordance with Fig. 8.7.4.1.3.

8.7.4.2.2 At least two of the column strip bottom bars or wires in each direction shall pass within the region bounded by the longitudinal reinforcement of the column and shall be anchored at exterior supports.

Prestressed two-way slabs

8.7.5.6 *Structural integrity*

8.7.5.6.1 Except as permitted in 8.7.5.6.3, at least two tendons with 1/2 in. diameter or larger strand shall be placed in each direction at columns in accordance with (a) or (b):

(a) Tendons shall pass through the region bounded by the longitudinal reinforcement of the column.

(b) Tendons shall be anchored within the region bounded by the longitudinal reinforcement of the column, and the anchorage shall be located beyond the column centroid and away from the anchored span.

8.7.5.6.2 Outside of the column and shear cap faces, the two structural integrity tendons required by **8.7.5.6.1** shall pass under any orthogonal tendons in adjacent spans.

8.7.5.6.3 Slabs with tendons not satisfying 8.7.5.6.1 shall be permitted if bonded bottom deformed reinforcement is provided in each direction in accordance with 8.7.5.6.3.1 through 8.7.5.6.3.3.

8.7.5.6.3.1 Minimum bottom deformed reinforcement A_s in each direction shall be the larger of (a) and (b). The value of *fy* shall be limited to a maximum of 80,000 psi:

(a) $A_s = [4.5 (f_c')^{0.5} c_2 d]/f_y$ (8.7.5.6.3.1a)

(b) $A_s = [300 c_2 d/f_y]$ (8.7.5.6.3.1b)

where c_2 is measured at the column faces through which the reinforcement passes.

8.7.5.6.3.2 Bottom deformed reinforcement calculated in 8.7.5.6.3.1 shall pass within the region bounded by the longitudinal reinforcement of the column and shall be anchored at exterior supports.

8.7.5.6.3.3 Bottom deformed reinforcement shall be anchored to develop f_y beyond the column or shear cap face.

Nonprestresssed two-way joint systems

8.8.1.6 For structural integrity, at least one bottom bar in each joist shall be continuous and shall be anchored to develop fy at the face of supports.

Cast-in-place beam

9.7.7 Structural integrity reinforcement in cast-in-place beams

9.7.7.1 For beams along the perimeter of the structure, structural integrity reinforcement shall be in accordance with (a) through (c):

(a) At least one-quarter of the maximum positive moment reinforcement, but not less than two bars or strands, shall be continuous

(b) At least one-sixth of the negative moment reinforcement at the support, but not less than two bars or strands, shall be continuous

(c) Longitudinal structural integrity reinforcement shall be enclosed by closed stirrups in accordance with 25.7.1.6 or hoops along the clear span of the beam

9.7.7.2 For other than perimeter beams, structural integrity reinforcement shall be in accordance with (a) or (b):

(a) At least one-quarter of the maximum positive moment reinforcement, but not less than two bars or strands, shall be continuous.

(b) Longitudinal reinforcement shall be enclosed by closed stirrups in accordance with 25.7.1.6 or hoops along the clear span of the beam.

9.7.7.3 Longitudinal structural integrity reinforcement shall pass through the region bounded by the longitudinal reinforcement of the column.

9.7.7.4 Longitudinal structural integrity reinforcement at noncontinuous supports shall be anchored to develop f_y at the face of the support.

9.7.7.5 If splices are necessary in continuous structural integrity reinforcement, the reinforcement shall be spliced in accordance with (a) and (b):

(a) Positive moment reinforcement shall be spliced at or near the support

(b) Negative moment reinforcement shall be spliced at or near midspan

9.7.7.6 Splices shall be mechanical or welded in accordance with 25.5.7 or Class B tension lap splices in accordance with 25.5.2.

Nonprestressed one-way joint system

9.8.1.6 For structural integrity, at least one bottom bar in each joist shall be continuous and shall be anchored to develop fy at the face of supports

Precast joint and connection

16.2.1.8 Integrity ties shall be provided in the vertical, longitudinal, and transverse directions and around the perimeter of a structure in accordance with 16.2.4 or 16.2.5

16.2.4 *Minimum connection strength and integrity tie requirements*

16.2.4.1 Except where the provisions of 16.2.5 govern, longitudinal and transverse integrity ties shall connect precast members to a lateral-force-resisting system, and vertical integrity ties shall be provided in accordance with 16.2.4.3 to connect adjacent floor and roof levels.

16.2.4.2 Where precast members form floor or roof diaphragms, the connections between the diaphragm and those members being

laterally supported by the diaphragm shall have a nominal tensile strength of not less than 300 lb per linear ft.

16.2.4.3 Vertical integrity ties shall be provided at horizontal joints between all vertical precast structural members, except cladding, and shall satisfy (a) or (b):

(a) Connections between precast columns shall have vertical integrity ties, with a nominal tensile strength of at least $200A_g$lb, where A_g is the gross area of the column. For columns with a larger cross section than required by consideration of loading, a reduced effective area based on the cross section required shall be permitted. The reduced effective area shall be at least one-half the gross area of

the column.

(b) Connections between precast wall panels shall have at least two vertical integrity ties, with a nominal tensile strength of at least 10,000 lb per tie.

16.2.5 Integrity tie requirements for precast concrete bearing wall structures three stories or more in height.

16.2.5.1 Integrity ties in floor and roof systems shall satisfy (a) through (f):

(a) Longitudinal and transverse integrity ties shall be provided in floor and roof systems to provide a

nominal tensile strength of at least 1500 lb per foot of width or length.

(b) Longitudinal and transverse integrity ties shall be provided over interior wall supports and between the floor or roof system and exterior walls.

(c) Longitudinal and transverse integrity ties shall be positioned in or within 2 ft of the plane of the floor or roof system.

(d) Longitudinal integrity ties shall be oriented parallel to floor or roof slab spans and shall be spaced not greater than 10 ft on center. Provisions shall be made to transfer forces around openings.

(e) Transverse integrity ties shall be oriented perpendicular to floor or roof slab spans and shall be spaced not greater than the bearing wall spacing.

(f) Integrity ties at the perimeter of each floor and roof, within 4 ft of the edge, shall provide a nominal tensile strength of at least 16,000 lb.

16.2.5.2 Vertical integrity ties shall satisfy (a) through (c):

(a) Integrity ties shall be provided in all wall panels and shall be continuous over the height of the building.

(b) Integrity ties shall provide a nominal tensile strength of at least 3000 lb per horizontal foot of wall.

(c) At least two integrity ties shall be provided in each wall panel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical change to the provisions of the code. Proposal simply adds language to IBC that reflects the nature of the provisions in ASTM E119

FS2-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee determined that the proposed exception language clarifies the requirements of "Restrained

classification" in the code. The exception is added to avoid sending the RDP to ASTM E119 to determine all concrete connections designed in accordance with ACI 318 for restrained movement relative to the supporting structural members (Vote: 11-0).

FS2-24

Individual Consideration Agenda

Comment 1:

IBC: 703.2.1.3

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

703.2.1.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. Restrained construction shall be identified on the *construction documents*. ~~**Exception**~~ **Exceptions:**

1. Unless otherwise determined by the *registered design professional*, concrete girders, beams, and slabs connected to structural concrete framing or structural concrete walls in accordance with ACI 318 shall be considered restrained. Restrained concrete construction shall be identified on the *construction documents*.
2. Unless otherwise determined by the *registered design professional*, cast-in-place or prefabricated concrete floor or roof construction secured to structural steel framing members and individual structural steel beams and girders that are welded or bolted to integral framing members shall be considered restrained construction in accordance with AISC 360, Appendix 4, Section 4.3.3. Restrained structural steel construction shall be identified on the *construction documents*.

Reason: The purpose of this modification is to add comparable information on restrained construction for structural steel elements. From AISC 360-22, Appendix 4, Section 4.3.3 states the following:

> **4.3.3. Restrained Construction**
>
> For floor and roof assemblies and individual beams in buildings, a restrained condition exists when the surrounding or supporting structure is capable of resisting forces and accommodating deformations caused by thermal expansion throughout the range of anticipated elevated temperatures. Cast-in-place or prefabricated concrete floor or roof construction secured to steel framing members, and individual steel beams and girders that are welded or bolted to integral framing members, shall be considered restrained construction.

Additionally, from AISC 360-22, Commentary Appendix Section 4.3.3:

> Gewain and Troup (2001) provide a detailed review of the background research and practices in the qualification fire-resistance testing and rating of structural steel and composite steel/concrete girders, beams, and steel-framed floors and roofs. The restrained assembly fire-resistance ratings, developed from tests on loaded restrained floor or roof specimens, and the restrained beam fire-resistance ratings, developed from tests on loaded restrained beam specimens, are commonly applicable to all types of steel-framed floors, roofs, girders, and beams, with minor exceptions, as recommended in Table X3.1 of ASTM E119, especially where they incorporate or support cast-in-place or prefabricated concrete slabs. AISC Design Guide 19, Fire Resistance of Structural Steel Framing (Ruddy et al., 2003), provides several detailed examples of steel-framed floor and roof designs by qualification testing.

Please refer to the full AISC 360-22 commentary for additional technical background and guidance on applying the provisions. AISC makes its standards available to all free of charge. AISC 360-22 can be downloaded for free from https://www.aisc.org/publications/steel-standards/.

Bibliography: AISC (2022), *Specification for Structural Steel Buildings*, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.
Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal references a standard already adopted in the 2024 IBC.

Comment (CAH2)# 478

Comment 2:

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org) requests As Submitted

Reason: Support committee action for approval as submitted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 375

FS6-24

IBC: 703.3.1, 703.3.2 (New)

Proposed Change as Submitted

Proponents: Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org); Darryl Dixon, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ddixon@nrmca.org)

2024 International Building Code

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136. **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Add new text as follows:

703.3.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: This code change provides a clarification to IBC Section 703.3.1, which requires that materials required to be noncombustible be tested in accordance with ASTM E136 or ASTM E2652. However, the testing requirements should not apply to clearly noncombustible materials such as concrete, masonry or steel.

The proposed text provides necessary clarification indicating that such materials are not required to be tested.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change provides an editorial clarification to the previous code section and will not increase or decrease the cost of construction.

FS6-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal based on the fact that the proposed text is confusing. The committee encouraged the proponent to work on modifying the proposal for the CAH2. Specifically, clarify the aspect ratio of some materials, organic materials, and add more specific language to clarify what needs to be tested. The committee suggested that the proposed modifications during the CAH1 be incorporated (Vote: 8-3).

FS6-24

Individual Consideration Agenda

Comment 1:

IBC: 703.3.1, 703.3.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136. **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Revise as follows:

703.3.2 ~~Inherently noncombustible materials~~ Testing not required. ~~Inherently noncombustible materials, such as concrete and steel,~~ The following building materials shall not be required to be tested to be acceptable as noncombustible building materials.

1. Steel.
2. Concrete, containing no combustible aggregates or fibers,
3. Masonry, containing no combustible aggregates or fibers,
4. Glass (excluding plastic glazing),
5. 5xxx and 6xxx series aluminum alloys.

Reason: Several materials can claim to be inherently noncombustible, in many cases without it being truly valid. For example, any plastic or wood materials are always combustible. This issue is an important consideration for building materials (as required in multiple areas of the IBC, such as chapters 6, 8 and 14, where requirements are different depending on whether the materials are or are not noncombustible.

Some materials exist (often insulation materials) where it is not possible to determine without testing (normally to ASTM E136, as required in section 703.3.1 of this code) whether they are truly noncombustible. For example, fiberglass insulation materials will always contain some combustible binder to be useful. The material can pass the ASTM E136 test (and be noncombustible) if it contains a small amount of binder but fail the test with larger amount of binder. That can only be determined by testing and is impossible to note visually.

It makes no sense to test steel, concrete or masonry (if they contain no combustible aggregates or fibers; this would have to be certified by the proponent). Therefore, as it has been shown by testing (and common sense) that testing steel, concrete or masonry to ASTM E136 is unnecessary, as they will pass the test they can be excluded from being required to be tested.

However, some new building materials are made with organic (such as foam plastics) components to lower the weight and make them easier to manipulate. In that case, it is unclear whether they are truly noncombustible materials, and they would need to be tested to know the answer for sure. That is why the requirement has been added that they contain no combustible aggregates or fibers.

Test results from at least two testing labs have been able to show that glass (whether ordinary glass or quartz) truly meets the requirements of ASTM E136 and is a noncombustible material. The same is not true for other glazing materials, which are typically plastic and are combustible; they must be excluded.

That brings up the question of aluminum. Typical building materials are, more often than not, alloys of aluminum and other metals. The

Aluminum Association has published a report in Building Safety Journal (August 17th, 2020) where they discuss the “noncombustibility” of aluminum. It is of great interest that the 4 aluminum alloys that they tested “were selected for their widespread use in construction”. Those alloys tested all passed the ASTM E136 test. However, the same report also states that “Aluminum, just like many comparable metals, is not combustible in any general application other than when it is specifically made to be.” That suggests that there may be some aluminum alloys that may or may not be noncombustible. After considerable debate and investigation of test reports, consensus was reached that most of the aluminum alloys used as building materials belong to the 6xxx series of alloys, with less than 1.2% magnesium, and the main ones (such as 6063, 6061, 6005) have all been tested for noncombustibility. In terms of sheet aluminum products, the series 5xxx alloys (such as 5052, 5083, 5005) are often used in construction, with higher levels if magnesium (the highest being 5083, which contains 4.9% magnesium). This product has also been tested and shown to be noncombustible. Therefore, consensus was reached that it is safe to include “5xxx and 6xxx series aluminum alloys” to the list of building materials that do not require testing to be considered noncombustible materials.

The task group that developed this comment included representatives from a variety of industries, including: steel, aluminum, concrete, masonry, glass, wood, and plastics.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will clarify that a number of materials are clearly noncombustible and will not require additional fire testing. If anything, this comment will decrease costs because less testing for non combustibility will be needed.

Comment (CAH2)# 106

FS7-24

IBC: 703.7

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

703.7 Sealing of adjacent mass timber elements. In *buildings* of Types IV-A, IV-B and IV-C construction, where a *fire-resistant joint system* is not required at abutting *joints* or intersections in accordance with Section 715, ~~sealant or adhesive~~ sealants meeting the requirements of ASTM C920 or adhesives meeting the requirements of ASTM D3498 shall be provided to resist the passage of air ~~in~~ at the following locations:

1. ~~At abutting~~ Abutting edges and intersections of *mass timber building elements* required to be fire-resistance rated.
2. ~~At abutting~~ Abutting intersections of *mass timber building elements* and *building elements* of other materials where both are required to be fire-resistance rated.

~~Sealants shall meet the requirements of ASTM C920. Adhesives shall meet the requirements of ASTM D3498.~~

~~**Exception**~~ **Exceptions:** Sealants or adhesives need not be provided ~~where they are not a required component of a tested fire-resistance-rated assembly~~ where any of the following apply:

1. The abutting edges or intersections were tested without sealants or adhesives as part of a *fire-resistance-rated* assembly.
2. The abutting edges or intersections occur entirely within a single *dwelling unit* or *fire area* in the same *story*.
3. Draftstopping material in accordance with Section 718.3.1 is installed on the unexposed side of the abutting edges or intersections.

Reason: With the addition of Types IV-A, IV-B, and IV-C construction to the code, a prescriptive requirement for sealing the abutting edges and intersections of fire-resistance-rated mass timber elements was adopted to reduce the likelihood of flames and hot gasses passing between mass timber elements to adjacent fire areas. The requirement for use of adhesives or sealants was prescribed based on details from compartment fire testing, where adhesives or sealants were used at the intersections of mass timber panels. However, the existing code language has been misapplied to require sealants or adhesives between mass timber assemblies that already require a fire-resistant joint system and between mass timber elements that aren't required to perform a fire separation function, such as the bearing of a beam on a column or a mass timber panel on a beam. In addition, other alternatives exist to resist air movement between mass timber elements where fire separation is required. This change addresses these issues.

- The first sentence of Section 703.7 is modified to clarify that Section 703.7 only applies where a fire-resistant joint system is not required, since a fire-resistant joint system would serve the intended purpose of the sealant or adhesive required by Section 703.7, and the inclusion of additional sealants or adhesives might compromise the fire-resistant joint system.
- Exception #1 is modified to clarify that it only applies to abutting edges or intersections that were tested without sealants or adhesives as part of the fire-resistance-rated assembly.
- Exception #2 acknowledges that it is not necessary to prevent passage of air from one side of a building element to the other if both sides of the building element are within the same dwelling unit or fire area.
- Exception #3 is added to recognize that in lieu of using sealant or adhesive, draftstopping material can be installed on the unexposed side to prevent passage of air through the abutting edges or intersections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This code change proposal will decrease the cost of construction by approximately $50 per tube of sealant or adhesive for each tube not used due to Exception 2 or 3.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal incorporates exceptions to the use of prescribed sealants or adhesives for conditions where such requirements are unnecessary. There will be both material (approximately $15 per tube of sealant or adhesive) and labor (approximately $35 of labor costs to install each tube) cost savings by reducing the locations where sealants or adhesives are installed.

FS7-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal based on the fact that the proposed text is confusing. The committee also wanted to see more data. The committee indicated that the proposal calls for testing that is nonexistent, stating "We do not do those tests in this fashion". The proposed requirement could be located in different section as suggested during the hearing (Vote: 7-4).

FS7-24

Individual Consideration Agenda

Comment 1:

IBC: 703.7, 703.7.1 (New), 703.7.2 (New)

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

703.7 Sealing of adjacent mass timber elements. In *buildings* of Types IV-A, IV-B and IV-C construction,joints or intersections of abutting mass timber building elements shall meet the requirements of 703.7.1 or 703.7.2.~~where a *fire-resistant joint system* is not required at abutting *joints* or intersections in accordance with Section 715, sealants meeting the requirements of ASTM C920 or adhesives meeting the requirements of ASTM D3498 shall be provided to resist the passage of air at the following locations:~~

1. ~~Abutting edges and intersections of *mass timber building elements* required to be fire-resistance rated.~~
2. ~~Abutting intersections of *mass timber building elements* and *building elements* of other materials where both are required to be fire-resistance rated.~~

~~**Exceptions:** Sealants or adhesives need not be provided where any of the following apply:~~

1. ~~The abutting edges or intersections were tested without sealants or adhesives as part of a *fire-resistance-rated* assembly.~~
2. ~~The Abutting edges or intersections occur entirely within a single *dwelling unit* or *fire area* in the same *story*.~~

3. ~~Draftstopping material in accordance with Section 718.3.1 is installed on the unexposed side of the abutting edges or intersections.~~

Add new text as follows:

703.7.1 Joints or intersections with a fire-resistant joint system. *Fire-resistant joint systems* used at joints or intersections shall be installed in accordance with Section 715.2.

703.7.2 Joints or intersections without a fire-resistant joint system. Where a *fire-resistant joint system* is not used, sealants meeting the requirements of ASTM C920 or adhesives meeting the requirements of ASTM D3498 shall be provided to resist the passage of air at the following locations:

1. At abutting edges and intersections of *mass timber building elements* required to be fire-resistance rated.
2. At abutting intersections of *mass timber building elements* and *building elements* of other materials where both are required to be fire-resistance rated.

Exceptions: Sealants or adhesives need not be provided at locations where any of the following apply:

1. The sealant or adhesive is not a required component of a tested *fire-resistance-rated* assembly.
2. The abutting edges or intersections occur entirely within a single *dwelling unit* within a *story* or *fire area* within a *story*.
3. Draftstop material in accordance with Section 718.3.1 is installed on the unexposed side of the abutting edges or intersections.

Reason: The provisions for the sealing of adjacent mass timber elements outlined in Section 703.7 enhance fire safety in buildings of Types IV-A, IV-B, and IV-C construction by restricting the passage of air to prevent the spread of fire and smoke, ultimately contributing to the overall fire protection strategy of the structure. Three changes were made based on comments from the committee in Committee Action Hearing #1 and to make the section easier to understand.

1. The charging language in Section 703.7 was changed to clarify that joints or intersections between mass timber building elements have different requirements when a fire-resistant joint system is used or not.

2. Section 703.7.1 is added to clarify that, when a fire-resistant joint system is used, it shall be installed in accordance with 715.2. This new section will avoid the potential misinterpretation that additional sealants or adhesives are also required, the use of which might compromise the fire-resistant joint system.

3. Section 703.7.2 is added to clarify requirements when a fire-resistant joint system is not used. The existing code language is relocated to this section and modified. Exceptions to 703.7.2 are provided in the code for specific scenarios where sealants or adhesives are not necessary.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This code change proposal will decrease the cost of construction by approximately $50 per tube of sealant or adhesive for each tube not used due to new section 703.7.1 or new section 703.7.2, Exceptions 2 and 3.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original code proposal for justification of cost decrease.

FS9-24

IBC: 704.5 (New), 704.5, 704.5.1, 704.5.2 (New), AWC Chapter 35 (New)

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Add new text as follows:

704.5 Protection of Connections and Attachments. Connections and attachments to structural members that are required to have a fire-resistance rating shall be protected in accordance with 704.5.1 and 704.5.2.

Revise as follows:

~~**704.5**~~ **704.5.1 Attachments to structural steel members.** The edges of lugs, brackets, rivets and bolt heads attached to structural steel members shall be permitted to extend to within 1 inch (25 mm) of the surface of the fire protection.

~~**704.5.1**~~ **704.5.1.1 Secondary attachments to structural steel members.** Where primary and secondary structural steel members require fire protection, any additional structural steel members having direct connection to the *primary structural frame* or *secondary structural members* shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches (305 mm), or shall be applied to the entire length where the attachment is less than 12 inches (305 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Add new text as follows:

704.5.2 Connections to structural wood members. Where a structural wood member is required to have a *fire-resistance rating*, structural connections to that member shall be protected from fire exposure for the time corresponding to the required *fire-resistance rating* of the member. Protection time shall be determined by one of the following:

1. Testing in accordance with Section 703.2.1 where the connection is part of the fire-resistance test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance rating* of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.
3. Engineering analysis in accordance with ANSI/AWC FDS.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Reason: The intent of this proposal is to:

1. Relocate criteria for the protection of connections between structural wood members from Chapter 23 to Chapter 7, alongside related criteria for structural steel connections and attachments.
2. Extend the requirements that currently apply specifically to connections in Types IV-A, IV-B, and IV-C construction to connections

between fire-resistance-rated structural wood members in general.

3. Add a reference to ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction*, which provides a design methodology for protecting connections with wood and/or gypsum, where protection times are assigned based on the temperature rise limitations established in ASTM E119 testing and Item #2 of existing Section 2304.10.1. The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

4. Clarify in the charging paragraph that connections must be protected for the time associated with the members being connected.

If this proposal is successful, the intention is to remove Section 2304.10.1 in the Group B code development process so there are not duplicative requirements in the code.

Bibliography: ANSI/AWC 2024 Fire Design Specification (FDS) for Wood Construction. View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal relocates a code section from Chapter 23 into a more proper location in Chapter 7. However, it does allow for this section to be available for design of wood members in other types of construction besides Type IV. It provides additional options for compliance with existing connection protection requirements specified in IBC 704.2 and IBC 704.3 without removing any of the existing options for demonstrating compliance. The inclusion of these additional options does not in and of itself increase or decrease the overall cost impact of the code, because these options may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS9-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language needs more clarification. The committee mentioned that the proposed text is a good starting point and the standard is needed. The proponent needs to look into the issue of adding "steel" in sections 704.5.1 and 704.5.1.1. Also, the proposed text does not address the structural aspect. Although the proponent mentioned that the proposal relocated criteria for the protection of connections between structural wood members from Chapter 23, the committee could not find the text in Chapter 23. The committee has an issue with proposing engineering analysis vs testing (Vote: 9-2).

FS9-24

Individual Consideration Agenda

Comment 1:

IBC: 704.5, 704.5.1, 704.5.1.1, 704.5.2

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

704.5 Protection of Connections and Attachments. Connections and attachments to structural members that are required to have a fire-resistance rating shall be protected in accordance with 704.5.1 and 704.5.2.

704.5.1 Attachments to structural ~~steel~~ members. The edges of lugs, brackets, rivets and bolt heads attached to structural ~~steel~~ members shall be permitted to extend to within 1 inch (25 mm) of the surface of the fire protection.

704.5.1.1 Secondary attachments to structural ~~steel~~ members. Where primary and secondary structural steel members require fire protection, any additional structural steel members having direct connection to the *primary structural frame* or *secondary structural members* shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches (305 mm), or shall be applied to the entire length where the attachment is less than 12 inches (305 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

704.5.2 Connections to structural wood members. Where a structural wood member is required to have a *fire-resistance rating*, structural connections to that member shall be protected from fire exposure for the time corresponding to the required *fire-resistance rating* of the member. Protection time shall be determined by one of the following:

1. Testing in accordance with Section 703.2.1 where the connection is part of the fire-resistance test.
2. Engineering analysis that demonstrates that the temperature rise at any portion of the connection is limited to an average temperature rise of 250°F (139°C), and a maximum temperature rise of 325°F (181°C), for a time corresponding to the required *fire-resistance rating* of the structural element being connected. For the purposes of this analysis, the connection includes connectors, fasteners and portions of wood members included in the structural design of the connection.
3. ~~Engineering analysis~~ Design of protection for structural connections in accordance with ANSI/AWC FDS.

Reason: This comment addresses two concerns that were brought up in the testimony at Committee Action Hearing #1.

1. This comment removes the word "steel" that was originally proposed to the titles and text of Sections 704.5.1 and 704.5.1.1 to address concerns that these sections should apply to all types of construction.

2. Option #3 in the proposed Section 704.5.2 removes the term "engineering analysis" and uses language more consistent with language used in the FDS.

One comment from the Committee regarded some confusion as to where the requirements for Option #2 can be found in the existing code. The requirements in Options #1 and #2 are currently found in Section 2304.10.1. It would be our intention to come back with a proposal in Group B to remove that section if this proposal is approved, so there are not duplicative code requirements in different sections. Chapter 23 is not permitted to be modified in Group A, so it could not be done as one code change at this time.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. This proposal relocates an existing section of code to a more appropriate location and adds an additional option for compliance.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal relocates requirements for protecting connections from Section 2304.10.1 to Section 704.5.2, which is mostly editorial. In addition, a third option is provided to protection connections through methods developed in the FDS. Both existing options are maintained in the code. If a designer or builder wants to protect a connection through the existign code methods they can, however this will give them an additional third option which may be beneficial to them.

FS10-24

IBC: 704.5.1

Proposed Change as Submitted

Proponents: Richard Walke, Creative Technology Inc. and CM Services, National Fireproofing Contractors Association (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

704.5.1 Secondary attachments to structural members. Where primary and secondary structural steel members require fire protection, any additional ~~structural~~ steel members having direct connection to the *primary structural frame* or *secondary structural member*, *and* having a cumulative unprotected footprint greater than 4.65 square inches (3,000 mm^2) per 3 linear feet or per linear meter of primary or secondary steel, shall be protected with the same fire-resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than ~~12~~18 inches (~~305~~457 mm), or shall be applied to the entire length where the attachment is less than ~~12~~18 inches (~~305~~457 mm) long. Where an attachment is hollow and the ends are open, the fire-resistive material and thickness shall be applied to both exterior and interior of the hollow steel attachment.

Reason: Section 704.6.1 of the 2021 IBC was establish based on a Proposal FS8-18 submitted by the California State Fire Marshal's Office. We supported the original intent of the proposal which was to protect secondary non-structural tubular steel attachments. However, during the code development process, the scope of the proposal changed significantly. In the end this section required protection of all "secondary steel attachments" to primary and second structural steel members.

But what is a "secondary steel attachment"? Members of the National Fireproofing Contactors Association (NFCA) have reported code officials are asking for anything and everything attached to the primary and second structural steel members be protected, including sometimes, the tie wires which support acoustical ceilings. That clearly was not the intent of the original proposal.

Section 704.6.1 was updated in the 2024 IBC as a result of Proposal FS11-21 submitted by National Fireproofing Contractors Association (NFCA) with help from the American Iron and Steel Institute. The focus of the changes was to limited the application of the section to structural members having direct connection to the primary structural frame or secondary structural members. Without having hard data to support a more surgical approach to what attachments truly impact the fire performance of the primary and second structural steel members, we believe this was a reasonable compromise.

After further research, we found guidance on the protection of attachments in a UL Solutions United Kingdom document. The 4.65 square inches (3,000 mm^2) per 3 linear feet or per linear meter of structural element length limitation included in this proposal is based on recommendation from *UL Solutions' guide to steelwork fire protection*. The same limitation is also stated in several other international documents relating to fireproofing, including:

1. The Fire and Blast Information Group (FABIG) Technical Note 11, entitled, *Fire Loading and Structural Response*.
2. International Coating's *Intertherm 750 Application Manual*.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Based on industry and manufacturer input, the average cost of protecting an intermediate size attachment for a distance of 18 in. from the primary or secondary steel is approximately $1 to $2.

Estimated Immediate Cost Impact Justification (methodology and variables):

This includes materials and labor costs for protecting a typical attachment for a distance of 18 in. The total cost in any given building will depend upon the number of attachments which will ultimately require protection.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal based on the fact that the proposal created unintended consequences. The proposal lacks supporting data on the issue addressed in the proposed code text (Vote: 11-0).

FS10-24

Individual Consideration Agenda

Comment 1:

Proponents: Richard Walke, Creative Technology Inc. and CM Services, National Fireproofing Contractors Association (richwalke61@gmail.com) requests As Submitted

Reason: At Committee Action Hearing #1, the proponents requested disapproval along with feedback from the Committee on the merits of this proposal. The Committee's feedback suggested they would like to see cases where unprotected attachments are a problem in order to support this proposal.

Since Committee Action Hearing #1, the National Fireproofing Contractors Association has initiated discussions with other industry stakeholders to develop data on the impact of attachments on the fire-resistance rating of building elements. At this time, our work is not far enough along to know what, if any, changes will be needed in this proposal. By requesting As Submitted, our goal is to keep the proposal active so as to be able to develop a comprehensive data backed proposal for the Public Comment Hearing in April, 2026.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 471

FS13-24

IBC: 705.2.2, 705.2.3.1

Proposed Change as Submitted

Proponents: Julius Carreon, City of Bellevue, Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

2024 International Building Code

Revise as follows:

705.2.2 Type III, IV or V construction. Projections from walls of Type III, IV or V construction shall be of any *approved* material. Balconies and similar projections of combustible construction shall comply with Section 705.2.3.1.

705.2.3.1 Balconies and similar projections. Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. *Fire-retardant-treated wood* shall not be permitted for balconies and similar projections on buildings of Type IV-A, IV-B, or IV-C construction. The aggregate length of the projections shall not exceed 50 percent of the *building*'s perimeter on each floor. **Exceptions:**

1. On *buildings* of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated *wood and plastic composites* that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on *buildings* of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.
5. On buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as *high-rise*, non-fire-resistance rated heavy timber building elements shall be permitted for balconies, porches, decks and exterior stairways not used as required exits.

Reason: This code change proposal is intended to clarify the requirements for combustible projections of Type III, IV or V construction in Section 705.2.2 and provides a new/separate exception for combustible projections of Types IV-A, IV-B and IV-C construction, three new construction types added in 2021 code cycle.

For projections of Type III, IV or V construction, the current construction requirements are not clear since Section 705.2.2 simply indicates the construction shall be of any "approved" material. What does an “approved” material mean, particularly when the construction material is combustible, and the type of construction requires fire protection such as for type III-A, IV-A, IV-B, IV-C and V-A? Section 705.2.3.1 provides the requirements when combustible materials are used but there is no direct code path to the section, since it is located as a subsection of 705.2.3 that applies only if the balcony/projection has fire separation distance (FSD) of less than 5-ft.

In addition, the 2021 IBC added three new construction types—IV-A, IV-B and IV-C—that allow the use of mass timber in buildings up to 18, 12 and nine stories. These new types are based on the previous Heavy Timber construction type (renamed Type IV-HT) but with additional fire-resistance ratings and levels of required noncombustible protection, to match the level of performance of Types I and II construction. It is not clear whether the additional fire-resistance ratings and levels of required noncombustible protection will also need to be applied for balconies and similar projections on these new mass timber construction types. It is our understanding that the current construction requirements in IBC Section 705.2 (projections) is intended for the traditional IV construction type (now classified as

Type IV-HT) and therefore not intended for high-rise buildings. The 2024 IBC has clarified exception #3 in 705.2.3.1, which permits the use of type V construction where sprinkler protection is provided, is limited to IV-HT but silent on IV-A, IV-B and IV-C. Hence, depending how the designer and code official interpret what is considered "approved" material in 705.2.2, the projection construction for these new types of construction could be conservative (i.e., all projections need the additional fire resistance rating and non-combustible protection per Table 601) or non-conservative (i.e., use type V, FRT, or exposed/non-rated heavy timber on 18 story high rise).

To address the ambiguity of the code language in Section 705.2.2 and the requirements for combustible projections on the new types of mass timber construction, we are proposing the following:

- Add a pointer on Section 705.2.2 to address combustible projection requirements on fire resistance rated construction types such as Types III-A, IV-A, V-A and new mass timber construction types IV-A/B/C. WABO TCD has also submitted a separate code change proposal that renumbers Section 705.2.3.1 to Section 705.2.4, to clarify and undo the inadvertent substantive change when the section of the code was moved from Section 1406.3 to Section 705.2.3.1 between 2015 and 2018 code (See FS15-15: http://media.iccsafe.org/codes/2015-2017/GroupA/PCH/IBC-Fire-Safety.pdf). Based on the reason statement for FS15-15 and its previous location in 2015 code, Section 705.2.3.1 should be applied independently from Section 705.2.3, which means it should not be constrained by fire separation distance requirements. By adding a pointer on Section 705.2.2, it makes it clear that where fire resistance rating is required by Table 601 for floor construction (i.e., Types III-A, IV-A, V-A and IV-A/B/C), any combustible projection construction will need to comply with 705.2.3.1 regardless if the projection is beyond the 5 feet separation distance trigger in Section 705.2.3. If both proposals are approved, our intent is that the other proposal (renumbering the section) would govern for both Section 705.2.3.1 and the pointer in Section 705.2.2.
- Add a clarifying prohibition and an exception in 705.2.3.1, to deal with combustible projections on Type IV-A, IV-B and IV-C construction.
    - Consistent with the intent of the original proponents of the proposal to introduce Types IV-A, IV-B, and IV-C into the code, fire-retardant treated wood is prohibited in those types of construction. This only affects stick-framed FRT wood, since FRT mass timber does not exist.
    - However, the exception will permit the use of (exposed) non-rated heavy timber construction on buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as high rise. This implies that combustible balconies and similar projections on Type IV-A and Type IV-B buildings more than 3-stories and Type IV-C buildings classified as high rise shall meet the type of construction in accordance with Table 601. We understand the fire performance requirements on Types IV-A and IV-B construction were developed based on Type I and Type II construction, hence, the proposed 3-stories cut-off for the exception on Type IV-A and Type IV-B is intended to align with the exception for Type I and Type II (705.2.3.1 exception 1). For Type IV-C, we are proposing a non-high rise cut-off to align with traditional Type IV-HT construction, which does not require fire rated construction (and both Type IV-C and Type IV-HT have 85 feet maximum building height limit).
    - WABO TCD sent a draft of the proposal to AWC and one comment that we received from them is that their preferred terminology was "heavy timber building elements," as opposed to "heavy timber construction" currently use in the IBC. The "heavy timber construction" terminology occurs in (9) other locations in the IBC but we have not proposed to change those in this proposal. If the committee agrees on replacing the terminology with "heavy timber building elements", we can submit an editorial change in the second CAH.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the reason statement of the proposal, the construction requirements for combustible balconies and similar projections on the three construction Types IV-A, IV-B and IV-C is currently very ambiguous. Depending how the designer and code official interpret what is considered "approved" material in the current code will determine if this code change proposal will increase or decrease the cost of construction. In general, construction for Types IV-A/B buildings 3-stories or less and Type IV-C buildings that aren't high rises may see a small decrease in cost as this code proposal makes it clear that exposed/non-rated heavy timber is permitted, as opposed to fire-resistance rated mass timber.

Recognizing that the choice of materials used in construction is an option, in jurisdictions where designers and code officials have allowed non-fire-resistance rated heavy timber for these balconies/projections, construction cost for Types IV-A/B buildings that are more than 3-stories and Type IV-C high rise buildings may see a small increase in cost as this code proposal implies the balconies/projection construction for these buildings will need additional fire resistance rating protection per Table 601. Data on the increase in cost is not readily available to people who aren't professional

estimators, but a 2022 online article (https://www.checkatrade.com/blog/cost-guides/cross-laminated-timber-cost/) estimates adding fire protection and soundproofing to cross-laminated timber costs approximately $3 to $7 per square foot. We assume the cost increase will be in this ballpark.

We do not consider the prohibition on FRT wood to be a cost increase since no amount of stick framing should have been allowed in these types of construction.

FS13-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata "HT" is existing text in 2024 IBC
705.2.3.1 Balconies and similar projections

3. Balconies and similar projections on buildings of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a fire-resistance rating where sprinkler protection is extended to these areas.

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification: 705.2.3.1 Balconies and similar projections. Balconies and similar projections of combustible construction other than fire-retardant treated wood shall be fire-resistance rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. ~~Fire-retardant treated wood~~ Wood structural elements not complying with Table 2304.11 shall not be permitted for balconies and similar projections on buildings of Type IV-A, IV-B, or IV-C construction. The aggregate length of the projections shall not exceed 50 percent of the building's perimeter on each floor.
Exceptions:

1. On *buildings* of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.

2. Untreated *wood and plastic composites* that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.

3. Balconies and similar projections on *buildings* of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.

4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.

5. On buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as *high-rise*, non-fire-resistance rated heavy timber building elements shall be permitted for balconies, porches, decks and exterior stairways not used as required exits.

Committee Reason: The committee agreed that the modification clarifies the intent of the proposal. The proposed text is a needed clarification to the code users (Vote: 11-0).

FS13-24

Individual Consideration Agenda

Comment 1:

IBC: 705.2.3.1

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

705.2.3.1 Balconies and similar projections. Balconies and similar projections of combustible construction other than *fire-retardant-treated wood* shall be *fire-resistance* rated where required by Table 601 for floor construction or shall be of heavy timber construction in accordance with Section 2304.11. Wood structural elements ~~not complying with Table 2304.11 shall not be permitted~~ for balconies and similar projections on buildings of Type IV-A, IV-B, or IV-C construction shall comply with Section 2304.11. The aggregate length of the projections shall not exceed 50 percent of the *building*'s perimeter on each floor.

Exceptions:

1. On *buildings* of Types I and II construction, three *stories* or less above *grade plane*, *fire-retardant-treated wood* shall be permitted for balconies, porches, decks and exterior *stairways* not used as required exits.
2. Untreated *wood and plastic composites* that comply with ASTM D7032 and Section 2612 are permitted for pickets, rails and similar *guard* components that are limited to 42 inches (1067 mm) in height.
3. Balconies and similar projections on *buildings* of Types III, IV-HT and V construction shall be permitted to be of Type V construction and shall not be required to have a *fire-resistance rating* where sprinkler protection is extended to these areas.
4. Where sprinkler protection is extended to the balcony areas, the aggregate length of the balcony on each floor shall not be limited.
5. On buildings of Types IV-A or IV-B construction three stories or less above grade plane, and Type IV-C construction not classified as *high-rise*, ~~non-fire-resistance rated~~ heavy timber *building elements* shall ~~be permitted~~ not be required to be *fire-resistance rated* for balconies, porches, decks and exterior stairways not used as required exits.

Reason: This is an editorial clean up of some of the language that was approved in Committee Action Hearing #1. In the charging statement, a floor modification made a reference to heavy timber complying with Table 2304.11. However, this should be a reference to heavy timber in compliance with Section 2304.11 (not Table 2304.11). By referencing Section 2304.11, the section will also apply to cross laminated timber (CLT) or other mechanically laminated floor deck which are permitted in heavy timber construction, but are not referenced in Table 2304.11. This sentence was also rearranged to remove a double negative. In Exception #5, language was copied from Exception #3 to make this exception clearer.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial clean up of the code language based on a floor modification in CAH1.

Comment (CAH2)# 32

FS14-24

IBC: 705.6, 705.6.1 (New)

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Delete and substitute as follows:

~~**705.6 Continuity.** The *fire-resistance rating* of *exterior walls* shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:~~

1. ~~The underside of the floor sheathing, roof sheathing, deck or slab above.~~
2. ~~The underside of a floor/ceiling or roof/ceiling assembly having a *fire-resistance rating* equal to or greater than the *exterior wall* and the *fire separation distance* is greater than 10 feet.~~

~~Parapets shall be provided as required by Section 705.12.~~

705.6 Continuity. The continuity of the *fire-resistance rating* shall extend from the top of the foundation to the top of the parapet. If a parapet is not required by Section 705.12, the *fire-resistance rating* shall extend to the underside of the roof sheathing, deck or slab.

Add new text as follows:

705.6.1 Supporting Construction. Where a floor or roof assembly supports an *exterior wall* or parapet above, the portion of the floor or roof assembly that supports the *exterior wall* or parapet shall have a *fire-resistance rating* of not less than the *fire-resistance rating* required for the *exterior wall* or parapet.

Reason: The proposed revision coordinates with existing requirements for fire-resistance rating (FRR) continuity for all types of supporting construction. Existing language, added in 2024 code development cycle (FS18-21), has caused confusion in application to platform construction because walls in platform construction are not continuous from foundation to roof. In platform construction, FRR continuity must be maintained through portions of floor or roof elements supporting the wall or parapet above, however, the wall itself is not continuous. The proposed revisions clarify that FRR continuity is to be maintained to the top of the parapet or to the underside of the roof deck where a parapet is not required. By clarifying the concept of FRR continuity versus continuity of the exterior wall, the intent of Item 2 in existing language is addressed more broadly and no longer necessary in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies that the important aspect of fire protection is the continuity of the fire-resistance as required in IBC 705.7.1, and not the continuity of the exterior wall itself.

FS14-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee approved the proposal based on the fact that the proposal coordinates with existing requirements for fire-resistance rating (FRR) continuity for all types of supporting construction (Vote: 8-3).

FS14-24

Individual Consideration Agenda

Comment 1:

IBC: 705.6, 705.6.1

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

705.6 Continuity. The continuity of the *fire-resistance rating* of *exterior walls* shall extend from the top of the foundation to the top of the parapet. If a parapet is not required by Section 705.12, the *fire-resistance rating* of *exterior walls* shall extend to the underside of the roof sheathing, deck or slab.

~~**705.6.1 Supporting Construction.** Where a floor or roof assembly supports an *exterior wall* or parapet above, the portion of the floor or roof assembly that supports the *exterior wall* or parapet shall have a *fire-resistance rating* of not less than the *fire-resistance rating* required for the *exterior wall* or parapet.~~

Reason: 705.6 Continuity: This section is proposed to be revised to add wording to clarify that fire-resistance rating in this section is for exterior walls. The wording added matches the current wording in 705.6.

705.6.1 Supporting Construction: This section is proposed to be deleted since FS16-24 was approved with a new section 705.8 for supporting construction. Since supporting construction is not a continuity requirement it should not be a subsection of the continuity section and it is preferred to have this in its own section as approved in FS16-24. Also, 705.6.1 is narrowly focused on supporting construction for platform framing, while 705.8 is general and covers all supporting construction for exterior walls (e.g., platform framing, curtain wall supported by slab edge or beam, or floor framing supporting a set back exterior wall).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As with original proposals FS14-24 and FS16-24, the proposed changes are clarifications since the code already includes continuity requirements (in Section 705.6) and includes supporting construction requirements (in Section 704.1.1 that is referenced in FS16-24).

Comment (CAH2)# 186

FS15-24

IBC: 705.7.1

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

705.7.1 Floor assemblies supporting exterior walls in Type III, IV and V construction. In Type III, IV and V construction where a floor assembly supports gravity loads from an *exterior wall*, the *fire-resistance rating* of the portion of the floor assembly that supports the *exterior wall* shall be not less than the *fire-resistance rating* required for the *exterior wall* in Table 601. The *fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of ~~Type III~~ the applicable type of construction.

Reason: Existing Section 705.7.1 was added by change proposal FS19-21 to address continuity of fire-resistance rating for exterior walls of Type III platform construction. These same structural stability requirements that are appliable to Type III construction are equally applicable to Type IV and V construction where platform construction is used.

The AWC *Design for Code Acceptance No. 3 (DCA 3)* document has design details to maintain the required fire resistance of the wall for fire exposure from the interior of the building, and, when required by IBC Section 705.5, for exposure from the exterior as well. Examples of these details can be found in the AWC DCA 3 document (a link has been provided in the bibliography section below). A ceiling membrane may or may not be present, but as shown in the existing language of Section 705.7.1 and the AWC DCA 3, it is an appropriate design assumption to consider its contribution when the fire rating of the floor assembly supporting the exterior wall is to be based on fire exposure from the interior of the building. This situation could occur in Type IV and V construction as well and the building elements will respond the same way in a fire, so those construction types should be included in this code section.

AWC has a separate change proposal to Section 705.6 to provide general language that supports the concept of continuity of fire-resistance rating applicable when exterior walls are continuous, and when floors intersect the exterior wall in typical platform construction.

Bibliography: American Wood Council *Design for Code Acceptance No. 3.* View this document online: https://awc.org/wp-content/uploads/2021/12/awc-dca3_20210209_awcwebsite.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides clarification of the applicability of existing code requirements for platform construction.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee concluded that the proposal is expanding on what was approved during the last cycle and it is the right step forward (Vote: 9-2).

Individual Consideration Agenda

Comment 1:

IBC: 705.7.1

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

705.7.1 Floor assemblies supporting exterior walls ~~in Type III, IV and V construction~~. ~~In Type III, IV and V construction where~~ Where a floor assembly supports gravity loads from an *exterior wall*, the *fire-resistance rating* of the portion of the floor assembly that supports the *exterior wall* shall be not less than the *fire-resistance rating* required for the *exterior wall* in Table 601. The *fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of the applicable type of construction.

Reason: This section is intended to clarify requirements for platform framed floor/ceiling assemblies that support exterior walls, and the original proposal expanded the scoping of this section to include Type III, IV and V construction, instead of just Type III. This comment proposes to further expand this to Type I and II construction by deleting the type of construction scoping. Types I and II construction can include platform framing with cold-formed steel joists just as Types III, IV and V construction have platform framing with wood joists, so this section should apply to all construction types.This is needed since this section allows the ceiling of a floor/ceiling assembly to contribute to the fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall. Approved proposal FS14-24 changed continuity requirements for the exterior wall to require continuity of the fire-resistance rating through the platform framed floor, while the current code language allows the exterior wall rating to stop at the underside of a floor/ceiling assembly that has the same rating as the wall. If this section isn't expanded to include Types I and II the ceiling contribution would not be allowed and it would be very difficult to continue the wall rating through the platform framed floor since the interior gypsum board would have to be continued around C-shaped joists, which is difficult, if not impossible, to achieve.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment expands the scoping to include Type I and II construction to allow the ceiling membrane to count towards the exterior wall rating. This is essentially the same as the current continuity requirements in 705.6 that allow the fire-resistance rating of an exterior wall to stop at the underside of a floor/ceiling assembly that has an equal or greater rating. Therefore, there is no cost impact relative to current code language.

FS16-24

IBC: 705.7.1, 705.8 (New)

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

~~705.7.1~~ 705.8.1 **Floor assemblies in Type III construction.** In Type III construction where a floor assembly supports gravity loads from an *exterior wall*, the~~*fire-resistance rating* of the portion of the floor assembly that supports the *exterior wall* shall be not less than the *fire-resistance rating* required for the *exterior wall* in Table 601. The~~*fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of Type III construction.

Add new text as follows:

705.8 Supporting construction. The supporting construction for an exterior wall shall have a fire-resistance rating as required by Section 704.1.1.

Reason: Currently, there is no specific requirement in Section 705 for supporting construction of exterior walls. However, such supporting construction must still meet the requirement of 704.1.1 that "The fire-resistance ratings of supporting structural members and assemblies shall be not less than the ratings required for the fire-resistance-rated assemblies supported by the structural members." The fire-resistance rating continuity requirements in 705.6 and the structural stability requirements of 705.7 essentially require supporting construction within the plane of an exterior wall to have the same fire-resistance rating as the wall supported. However, there are often cases where a fire-resistance rated exterior curtain wall is supported by a floor or beam that is inside the exterior wall, which is not covered by these sections. Also, where exterior walls step back at an upper floor, the exterior wall is supported on a floor or beam below the wall. For these cases, 704.1.1 currently requires the supporting construction to have a fire-resistance rating not less than the wall supported, but this is often missed by designers.

As an example, a 5-story Type III building could have a set-back exterior wall at the 5th story that is a bearing wall for the roof, and this wall requires a 2-hour fire-resistance rating per Table 601. Designers often miss that the floor or beam supporting this wall at Level 5 also needs to have a 2-hour fire-resistance rating, as well as all supporting construction below this floor or beam down to the foundation. When this is discovered in plan review, there are significant changes needed to the drawings to meet the requirements. This proposal is intended to avoid this by providing a direct reference to 704.1.1 in a new supporting construction section, 705.8, which will located after 705.7 that includes structural stability requirements for lateral bracing of the wall.

Current Section 705.7.1 for floor assemblies in Type III construction is relocated to be a subsection to the new supporting construction section since it addresses supporting construction requirements directly. Some wording in this section is proposed to be deleted since it is redundant with the new 705.8 section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification with a pointer to an existing requirement, so there is no cost impact.

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification:

705.8.1 Floor assemblies in Type III construction.
In Type III construction where a portion of a floor assembly within the plane of the *exterior wall* supports gravity loads from an *exterior wall*, the *fire-resistance rating* provided by the portion of the floor assembly ~~supporting and within the plane of the *exterior wall*~~ shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of Type III construction.

Committee Reason: The committee determined that the proposed modifications fix the issue in the original proposal by adding a "portion of a floor". The committee agreed that the added text for supporting the construction of exterior walls is needed (Vote: 11-0).

FS16-24

Individual Consideration Agenda

Comment 1:

IBC: 705.8, 705.8.1

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org); Edward Lisinski, American Wood Council, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

705.8 Supporting construction. The supporting construction for ~~an exterior wall~~ *exterior walls* and parapets shall have a ~~fire-resistance rating~~ *fire-resistance rating* as required by Section 704.1.1.

705.8.1 Floor assemblies in Type III construction. In Type III construction where a portion of a floor assembly within the plane of the *exterior wall* supports gravity loads from an *exterior wall*, the *fire-resistance rating* provided by the portion of the floor assembly shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of Type III construction.

Reason: RENN: The original proposal includes supporting construction requirements for exterior walls. This comment expands this to include supporting construction for parapets. This is needed to correlate with approved FS17-24 that includes requirements for platform framed roofs that support fire-resistance rated parapets. (Note that the new section in FS17-24 is proposed to be a subsection of 705.8 in a separate comment for FS17-24.)

This comment also makes editorial changes to put defined terms in italics.

LISINSKI: This public comment is to coordinate the approved FS16-24, which created a new section 705.8, with action taken on FS17-24. The approval

for FS17-24 added requirements for supporting of parapets, and therefore parapets need to be added to the charging language of this section. This is intended to just be editorial to coordinate with action taken in Committee Action Heating #1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

RENN: This proposal adds supporting construction requirements for parapets in new section 705.8, but these requirements are already in the code in 704.1.1 that this new section references. Therefore, there is no change to the cost of construction.

LISINSKI: This is an editorial proposal to coordinate with action taken on FS17-24.

Comment (CAH2)# 189

FS17-24

IBC: 705.7.2 (New)

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Add new text as follows:

705.7.2 Roof assemblies supporting parapets in Type III, IV and V construction. In Type III, IV and V construction where a roof assembly supports gravity loads from a parapet, the *fire-resistance rating* of the portion of the roof assembly that supports the parapet shall be not less than the *fire-resistance rating* required for the parapet in Section 705.12. The *fire-resistance rating* provided by the portion of the roof assembly supporting the parapet shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a roof assembly supports gravity loads from a parapet, the *building elements* of the roof construction within the plane of the *exterior wall*, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for roof assemblies of the applicable type of construction.

Reason: The proposed new section adds criteria that parallels Section 705.7.1, except that Section 705.7.1 is specific to floor assemblies supporting an exterior wall above. This change is necessary to clarify that the same criteria would also apply to a roof assembly supporting a parapet above. This is further necessary because parapet construction is addressed by the requirements of Section 705.12 and does not fall under the definition of exterior wall. The change clarifies that fire resistance is permitted to include the contribution of the ceiling membrane when considering exposure from the inside, just as it is for floor assemblies in platform construction.

AWC has a separate change proposal to Section 705.6 that provides general language in support of the concept of continuity of fire-resistance rating for roof assemblies supporting a parapet as it occurs in typical platform construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal provides clarification that roof assemblies supporting a parapet above shall have the same criteria as floor assemblies supporting an exterior wall above.

FS17-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee indicated that the proposal clarifies the code requirements for roof assemblies supporting parapets in Type III, IV and V construction. One of the committee members had an issue with what requirements are intended in the proposed text "Where a roof assembly supports gravity loads from a parapet, the building elements of the roof construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for roof assemblies of the applicable type of construction." (Vote: 10-1).

FS17-24

Individual Consideration Agenda

Comment 1:

IBC: 705.7.2

Proponents: Edward Lisinski, American Wood Council, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

705.7.2 Roof assemblies supporting parapets in Type III, IV and V construction. In Type III, IV and V construction where a portion of a roof assembly within the plane of the *exterior wall* supports gravity loads from a parapet, the *fire-resistance rating* ~~of the portion of the roof assembly that supports the parapet shall be not less than the *fire-resistance rating* required for the parapet in Section 705.12. The *fire-resistance rating*~~ provided by the portion of the roof assembly supporting and within the plane of the parapet shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a roof assembly supports gravity loads from a parapet, the *building elements* of the roof construction within the plane of the *exterior wall*, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for roof assemblies of the applicable type of construction.

Reason: This change is editorial to coordinate this proposal with action taken on FS16-24 in CAH1. This edits the code language to match 705.8.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is editorial to coordinate with action taken on FS16-24.

Comment (CAH2)# 151

Comment 2:

IBC: 705.7.2

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

705.7.2 Roof assemblies supporting parapets ~~in Type III, IV and V construction.~~ ~~In Type III, IV and V construction where~~ Where a portion of a roof assembly within the plane of the *exterior wall* supports gravity loads from a parapet, the ~~*fire-resistance rating* of the portion of the roof assembly that supports the parapet shall be not less than the *fire-resistance rating* required for the parapet in Section 705.12. The~~ *fire-resistance rating* provided by the portion of the roof assembly ~~supporting the parapet~~ shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a roof assembly supports gravity loads from a parapet, the *building elements* of the roof construction within the plane of the *exterior wall*, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for roof assemblies of the applicable type of construction.

Reason: This section is intended to clarify requirements for platform framed roof/ceiling assemblies that support parapets, and the original proposal includes Type III, IV and V construction. This comment proposes to expand this to Type I and II construction by deleting

the type of construction scoping. Types I and II construction can include platform framing with cold-formed steel joists just as Types III, IV and V construction have platform framing with wood joists, so this section should apply to all construction types.
This is needed since this section allows the ceiling of a roof/ceiling assembly to contribute to the fire-resistance rating provided by the portion of the roof assembly supporting and within the plane of the exterior wall. Approved proposal FS14-24 changed continuity requirements for the exterior wall to require continuity of the fire-resistance rating through the platform framed roof, while the current code language allows the exterior wall rating to stop at the underside of a roof/ceiling assembly that has the same rating as the wall. If this section isn't expanded to include Types I and II the ceiling contribution would not be allowed and it would be very difficult to continue the wall rating through the platformed framed roof since the interior gypsum board would have to be continued around C-shaped joists, which is difficult, if not impossible, to achieve.This comment also includes wording changes to match wording in FS16-24 that includes a related floor assembly section, which was approved as modified by committee. The wording regarding required fire-resistance rating of the portion of the roof assembly supporting the parapet is removed since this is already covered by new section 705.8 that is in FS16-24.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment expands the scoping to include Type I and II construction to allow the ceiling membrane to count towards the exterior wall rating. This is essentially the same as the current continuity requirements in 705.6 that allow the fire-resistance rating of an exterior wall to stop at the underside of a roof/ceiling assembly that has an equal or greater rating. Therefore, there is no cost impact relative to current code language. Other changes in this comment are editorial to match approved FS16-24.

Comment (CAH2)# 188

FS21-24 Part I

IBC: 706.1, 707.1, 708.1, 709.1, 710.1, 711.1, TABLE 307.1.1, 402.4.2.2, 402.4.2.3, [BE] 402.8.7, 402.4.2.1, 404.6, 405.4.2, 405.4.3, 406.3.1, 406.6.4.1, 407.3, [BE] 407.4.4.2, [BE] 407.5, 408.7, 410.4.1, 410.4.2, 412.4.1, 412.3.4, 420.2, 420.3, 420.6, 422.2, 503.1, 508.4.4.1, 509.4.1, 510.7.1, 510.8, 706.1.1, 713.2, 713.5, 713.11, 713.13.3, 713.13.4, 901.7, 909.20.2, 909.20.6.1, 913.2.1, 1009.6.4, 1023.2, 1023.3.1, 1023.12.1, 1024.3, 1026.2, 1028.2, 1030.1.1.1, 3005.4, 3006.3, 3104.5.1; IFC: [BF] 909.20.2, [BF] 909.20.5.1, [BE] 1023.2, [BE] 1023.3.1, [BE] 1023.12.1, [BE] 1026.2, [BE] 1028.2, [BE] 1030.1.1.1

Proposed Change as Submitted

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FIRE SAFETY CODE COMMITTEE. PART II WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

706.1 General. *Fire walls* required by this code or the *International Fire Code* shall be constructed in accordance with Sections 706.2 through 706.11. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply.

707.1 General. *Fire barriers* ~~installed as~~ required ~~elsewhere in~~by this code or the *International Fire Code* shall comply with this section.

708.1 General. The following wall assemblies shall comply with this section:

1. Separation walls as required by Section 420.2 for Group I-1 and Group R occupancies.
2. Walls separating tenant spaces in *covered and open mall buildings* as required by Section 402.4.2.1.
3. *Corridor* walls as required by Section 1020.3.
4. Enclosed elevator lobby separation as required by Section 3006.3.
5. Egress balconies as required by Section 1021.2
6. Walls separating *ambulatory care facilities* from adjacent spaces, *corridors* or tenants as required by Section 422.2.
7. Walls separating *dwelling and sleeping units* in Groups R-1 and R-2 in accordance with Sections 907.2.8.1 and 907.2.9.1.
8. Vestibules in accordance with Section 1028.2.

Revise as follows:

709.1 General. Vertical and horizontal *smoke barriers* required by this code or the *International Fire Code* shall comply with this section.

710.1 General. *Smoke partitions* ~~installed as~~ required ~~elsewhere in the~~by this code or the *International Fire Code* shall comply with this section.

711.1 General. *Horizontal assemblies* required by this code or the *International Fire Code* shall comply with Section 711.2. Nonfire-resistance-rated floor and *roof assemblies* shall comply with Section 711.3.

TABLE 307.1.1 HAZARDOUS MATERIALS EXEMPTIONS[a]

MATERIAL CLASSIFICATION	OCCUPANCY OR APPLICATION	EXEMPTION

Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establishments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140ºF is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by not less than 1-hour fire barriers ~~constructed in accordance with Section 707~~ or ~~1-hour~~ horizontal assemblies ~~constructed in accordance with Section 711~~, or both
		The quantity of combustible liquid solvents having a flash point at or above 200ºF is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the International Fuel Gas Code is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the International Mechanical Code is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Section 416.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 of the *International Fire Code* is not limited. .
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code* is not limited. The location of the ABHR dispensers shall be provided in the construction documents.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration Systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785L, °C = (°F - 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with applicable provisions of the International Fire Code.

402.4.2.2 Anchor building separation. An *anchor building* shall be separated from the *covered* or *open mall building* by *fire walls* ~~complying with Section 706~~. **Exceptions:**

1. *Anchor buildings* of not more than three *stories above grade plane* that have an occupancy classification the same as that permitted for tenants of the *mall building* shall be separated by not less than 2-hour fire-resistance-rated *fire barriers* ~~complying with Section 707~~.
2. The *exterior walls* of *anchor buildings* separated from an *open mall building* by an *open mall* shall comply with Table 705.5.

402.4.2.3 Parking garages. An attached garage for the storage of passenger vehicles having a capacity of not more than nine *persons* and *open parking garages* shall be considered as a separate *building* where it is separated from the *covered or open mall building* or *anchor building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.
Parking garages, which are separated from *covered mall buildings*, *open mall buildings* or *anchor buildings*, shall comply with the provisions of Table 705.5.

Pedestrian walkways and tunnels that connect garages to mall *buildings* or *anchor buildings* shall be constructed in accordance with Section 3104.

[BE] 402.8.7 Service areas fronting on exit passageways. Mechanical rooms, electrical rooms, building service areas and service elevators are permitted to open directly into *exit passageways*, provided that the *exit passageway* is separated from such rooms with not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire protection rating* of openings in the *fire barriers* shall be not less than 1 hour.

402.4.2.1 Tenant separations. Each tenant space shall be separated from other tenant spaces by ~~a~~ *fire partitions* ~~*partition* complying with Section 708~~. A tenant separation wall is not required between any tenant space and the *mall*.

404.6 Enclosure of atriums. *Atrium* spaces shall be separated from adjacent spaces by a 1-hour *fire barrier* ~~constructed in accordance with Section 707~~ or a *horizontal assembly* ~~constructed in accordance with Section 711~~, or both. **Exceptions:**

1. A *fire barrier* is not required where a glass wall forming a *smoke partition* is provided. The glass wall shall comply with all of the following:
   1.1. *Automatic* sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway on the *atrium* side. The sprinklers shall be located between 4 inches and 12 inches (102 mm and 305 mm) away from the glass and at intervals along the glass not greater than 6 feet (1829 mm). The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.
   1.2. The glass wall shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.
   1.3. Where glass doors are provided in the glass wall, they shall be either *self-closing* or automatic-closing.
2. A *fire barrier* is not required where a glass-block wall assembly complying with Section 2110 and having a $^{3}/_{4}$-hour *fire protection rating* is provided.
3. A *fire barrier* is not required between the *atrium* and the adjoining spaces of up to three floors of the *atrium* provided that such spaces are accounted for in the design of the smoke control system.
4. In other than Group I-2 and Group I-1, Condition 2, a *fire barrier* is not required between the *atrium* and the adjoining spaces where the *atrium* is not required to be provided with a smoke control system.

5. In Group I-2 and Group I-1, Condition 2, a *fire barrier* is not required between the *atrium* and the adjoining spaces, other than care recipient sleeping or treatment rooms, for up to three *stories* of the *atrium* provided that such spaces are accounted for in the design of the smoke control system and do not provide access to care recipient sleeping or treatment rooms.
6. A *horizontal assembly* is not required between the *atrium* and openings for escalators complying with Section 712.1.3.
7. A *horizontal assembly* is not required between the *atrium* and openings for *exit access stairways* and *ramps* complying with Item 4 of Section 1019.3.

405.4.2 Smoke barrier penetration. The compartments shall be separated from each other by ~~a~~ *smoke* barriers ~~*barrier* in accordance with Section 709~~. Penetrations between the two compartments shall be limited to plumbing and electrical piping and conduit that are firestopped in accordance with Section 714. Doorways shall be protected by *fire door assemblies* that comply with Section 716, automatic-closing by smoke detection in accordance with Section 716.2.6.6 and installed in accordance with NFPA 105 and Section 716.2.2.1. Where provided, each compartment shall have an air supply and an exhaust system independent of the other compartments.

405.4.3 Elevators. Where elevators are provided, each compartment shall have *direct access* to an elevator. Where an elevator serves more than one compartment, an enclosed elevator lobby shall be provided and shall be separated from each compartment by a *smoke barrier* ~~in accordance with Section 709~~. Doorways in the *smoke barrier* shall be protected by *fire door assemblies* that comply with Section 716, shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1 with the UL 1784 test conducted without an artificial bottom seal, and shall be automatic-closing by smoke detection in accordance with Section 716.2.6.6.

406.3.1 Classification. *Private garages* and carports shall be classified as Group U occupancies. Each *private garage* shall be not greater than 1,000 square feet (93 m^2) in area. Multiple *private garages* are permitted in a *building* where each *private garage* is separated from the other *private garages* by not less than 1-hour *fire barriers* ~~in accordance with Section 707,~~ or ~~1-hour~~ *horizontal assemblies* ~~in accordance with Section 711~~, or both.

406.6.4.1 Separation. *Mechanical-access enclosed parking garages* shall be separated from other occupancies and accessory uses by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~by not less than 2-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

407.3 Corridor wall construction. Corridor walls shall be constructed as *smoke partitions* ~~in accordance with Section 710~~.

[BE] 407.4.4.2 Separation. *Care suites* shall be separated from other portions of the *building*, including other *care suites*, by ~~a~~ *smoke partitions* ~~*partition* complying with Section 710~~.

[BE] 407.5 Smoke barriers. *Smoke barriers* shall be provided to subdivide every *story* used by *persons* receiving care, treatment or sleeping into not fewer than two *smoke compartments. Smoke barriers* shall be provided to subdivide other *stories* with an *occupant load* of 50 or more *persons*, into not fewer than two *smoke compartments.* ~~The *smoke barrier* shall be in accordance with Section 709.~~

408.7 Security glazing. In occupancies in Group I-3, windows and doors in 1-hour *fire barriers* ~~constructed in accordance with Section 707~~, *fire partitions* ~~constructed in accordance with Section 708~~ and *smoke barriers* ~~constructed in accordance with Section 709~~ shall be permitted to have security glazing installed provided that the following conditions are met.

1. Individual panels of glazing shall not exceed 1,296 square inches (0.84 m^2).
2. The glazing shall be protected on both sides by an *automatic sprinkler system*. The sprinkler system shall be designed to, when actuated, wet completely the entire surface of any glazing affected by fire.
3. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
4. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

410.4.1 Separation from stage. The *stage* shall be separated from dressing rooms, scene docks, property rooms, workshops,

storerooms and compartments contiguous to the *stage* and other parts of the *building* by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire-resistance rating* shall be not less than 2 hours for stage heights greater than 50 feet (15 240 mm) and not less than 1 hour for *stage* heights of 50 feet (15 240 mm) or less.

410.4.2 Separation from each other. Dressing rooms, scene docks, property rooms, workshops, storerooms and compartments contiguous to the *stage* shall be separated from each other by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

412.4.1 Fire separation. A hangar shall not be attached to a *dwelling* unless separated by ~~a~~ not less than 1-hour *fire barriers* ~~*barrier* having a *fire-resistance rating* of not less than 1 hour~~. Such separation shall be continuous from the foundation to the underside of the roof and unpierced except for doors leading to the *dwelling unit*. Doors into the *dwelling unit* shall be equipped with *self-closing* devices and conform to the requirements of Section 716 with a noncombustible raised sill not less than 4 inches (102 mm) in height. Openings from a hangar directly into a room used for sleeping purposes shall not be permitted.

412.3.4 Heating equipment. Heating equipment shall be placed in another room separated by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Entrance shall be from the outside or by means of a vestibule providing a two-doorway separation. **Exceptions:**

1. Unit heaters and vented infrared radiant heating equipment suspended not less than 10 feet (3048 mm) above the upper surface of wings or engine enclosures of the highest aircraft that are permitted to be housed in the hangar need not be located in a separate room provided that they are mounted not less than 8 feet (2438 mm) above the floor in shops, offices and other sections of the hangar communicating with storage or service areas.
2. Entrance to the separated room shall be permitted by a single interior door provided that the sources of ignition in the appliances are not less than 18 inches (457 mm) above the floor.

420.2 Separation walls. Walls separating *dwelling units* in the same building, walls separating *sleeping units* in the same *building* , walls separating *dwelling units* from *sleeping units* in the same *building* and walls separating *dwelling* or *sleeping units* from other occupancies contiguous to them in the same building shall be constructed as *fire partitions* ~~in accordance with Section 708~~.

420.3 Horizontal separation. Floor assemblies separating *dwelling units* in the same *buildings*, floor assemblies separating *sleeping units* in the same *building* , floor assemblies separating *dwelling units* from *sleeping units* in the same *building* and floor assemblies separating dwelling or *sleeping units* from other occupancies contiguous to them in the same *building* shall be constructed as *horizontal assemblies* ~~in accordance with Section 711~~.

420.6 Smoke barriers in Group I-1, Condition 2. *Smoke barriers* shall be provided in Group I-1, Condition 2 to subdivide every *story* used by *persons* receiving care, treatment or sleeping and to provide other *stories* with an *occupant load* of 50 or more *persons*, into not fewer than two *smoke compartments*. Such *stories* shall be divided into *smoke compartments* with an area of not more than 22,500 square feet (2092 m^2) and the distance of travel from any point in a *smoke compartment* to a *smoke barrier* door shall not exceed 200 feet (60 960 mm). ~~The *smoke barrier* shall be in accordance with Section 709.~~

422.2 Separation. *Ambulatory care facilities* where the potential for four or more care recipients are to be *incapable of self-preservation* at any time shall be separated from adjacent spaces, *corridors* or tenants with a *fire partition* ~~installed in accordance with Section 708~~.

503.1 General. Unless otherwise specifically modified in Chapter 4 and this chapter, *building height*, number of *stories* and *building area* shall not exceed the limits specified in Sections 504 and 506 based on the type of construction as determined by Section 602 and the occupancies as determined by Section 302 except as modified hereafter. *Building height*, number of *stories* and *building area* provisions shall be applied independently. For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more *fire walls* ~~complying with Section 706~~ shall be considered to be a separate building.

508.4.4.1 Construction. Required separations shall be *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, so as to completely separate adjacent occupancies. *Mass timber* elements serving as *fire barriers* or *horizontal assemblies* to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of

the *building* with an *approved* thermal barrier consisting of *gypsum board* that is not less than $^{1}/_{2}$ inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275. **Exception:** A thermal barrier shall not be required on the top of horizontal assemblies serving as occupancy separations.

509.4.1 Separation. Where Table 509.1 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the *building* by ~~a *fire* barrier constructed in accordance with Section 707~~ or ~~a *horizontal* assembly constructed in accordance with Section 711~~, or both. Construction supporting 1-hour *fire barriers* or *horizontal assemblies* used for incidental use separations in *buildings* of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

510.7.1 Fire separation. *Fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~ between the parking occupancy and the upper occupancy shall correspond to the required *fire-resistance rating* prescribed in Table 508.4 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking *structure*, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. *Means of egress* for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by not less than 2-hour *fire barriers* ~~having not less than a 2-hour *fire-resistance rating* as required by Section 707 with *self-closing* doors complying with Section 716~~ or *horizontal assemblies* ~~having not less than a 2-hour *fire-resistance rating* as required by Section 711~~, or both with *self-closing* doors complying with Section 716. *Means of egress* from the *open parking garage* shall comply with Section 406.5.

510.8 Group B or M buildings with Group S-2 open parking garage above. Group B or M occupancies located below a Group S-2 *open parking garage* of a lesser type of construction shall be considered as a separate and distinct *building* from the Group S-2 *open parking garage* for the purpose of determining the type of construction where the following conditions are met:

1. The *buildings* are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the *building* below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The *building* below the *horizontal assembly* is of Type IA construction. **Exception:** The *building* below the *horizontal assembly* shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the *building* below is not greater than *one story* in height above *grade plane.*
5. The height and area of the *building* below the *horizontal assembly* does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 *open parking garage* does not exceed the limits set forth in Section 406.5. The height, in both feet and *stories*, of the Group S-2 *open parking garage* shall be measured from *grade plane* and shall include the *building* below the *horizontal assembly*.
7. *Exits* serving the Group S-2 *open parking garage* ~~shall~~ discharge at grade with direct and unobstructed access to a street or *public way* and are separated from the *building* below the *horizontal assembly* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~2-hour *horizontal assemblies* constructed in accordance with Section 711~~, or both.

706.1.1 Party walls. Any wall located on a *lot line* between adjacent *buildings*, which is used or adapted for *joint* service between the two *buildings*, shall be constructed as a *fire wall* ~~in accordance with Section 706~~. Party walls shall be constructed without openings and shall create separate *buildings*. **Exceptions:**

1. Openings in a party wall separating an *anchor building* and a *mall* shall be in accordance with Section 402.4.2.2.1.
2. Party walls and *fire walls* are not required on *lot lines* dividing a *building* for ownership purposes where the aggregate height and area of the portions of the *building* located on both sides of the *lot line* do not exceed the maximum height and area requirements of this code. For the *building official's* review and approval, the official shall be provided with copies of dedicated access easements and contractual agreements that permit the *owners* of portions of the building located on either side of the *lot line* access to the other side for purposes of maintaining fire and *life safety systems* necessary for the operation of the building.

713.2 Construction. *Shaft enclosures* shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~in accordance with Section 711~~, or both.

713.5 Continuity. *Shaft enclosures* shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 711.2.2 for *horizontal assemblies*, as applicable.

713.11 Enclosure at the bottom. *Shafts* that do not extend to the bottom of the *building* or *structure* shall comply with one of the following:

1. Be enclosed at the lowest level with construction of the same *fire-resistance rating* as the *lowest floor* through which the *shaft* passes, but not less than the rating required for the *shaft enclosure.*
2. Terminate in a room having a use related to the purpose of the *shaft*. The room shall be separated from the remainder of the *building* by *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The *fire-resistance rating* and opening protectives shall be not less than the protection required for the *shaft enclosure*.
3. Be protected by *approved fire dampers* installed in accordance with their listing at the *lowest floor* level within the *shaft enclosure*.

Exceptions:

1. The fire-resistance-rated room separation is not required, provided that the only openings in or penetrations of the *shaft enclosure* to the interior of the *building* occur at the bottom. The bottom of the *shaft* shall be closed off around the penetrating items with materials permitted by Section 718.3.1 for *draftstops* , or the room shall be provided with an *approved automatic sprinkler system*.
2. A *shaft enclosure* containing a waste or linen chute shall not be used for any other purpose and shall discharge in a room protected in accordance with Section 713.13.4.
3. The fire-resistance-rated room separation and the protection at the bottom of the *shaft* are not required provided that there are no combustibles in the *shaft* and there are no openings or other penetrations through the *shaft enclosure* to the interior of the *building*.

713.13.3 Chute access rooms. Access openings for waste, recycling or linen chutes shall be located in rooms or compartments enclosed by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings into the access rooms shall be protected by opening protectives having a *fire protection rating* of not less than $^3/_4$ hour. Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. The room or compartment shall be configured to allow the access door to the room or compartment to close and latch with the access panel to the chute in any position.

713.13.4 Chute discharge room. Waste, recycling or linen chutes shall discharge into an enclosed room separated by *fire barriers* with a *fire-resistance rating* not less than the required fire rating of the *shaft enclosure* ~~and constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings into the discharge room from the remainder of the *building* shall be protected by opening protectives having a *fire protection rating* based on the fire rating of the *shaft enclosure* in accordance with Tables 716.1(2) and 716.1(3) . Doors shall be self- or automatic-closing upon the detection of smoke in accordance with Section 716.2.6.6. Waste chutes shall not terminate in an incinerator room. Waste and linen rooms that are not provided with chutes need only comply with Table 509.1.

901.7 Fire areas. Where *buildings*, or portions thereof, are divided into *fire areas* so as not to exceed the limits established for requiring a *fire protection system* in accordance with this chapter, such *fire areas* shall be separated by *fire walls* ~~constructed in accordance with Section 706~~, *fire barriers* ~~constructed in accordance with Section 707~~, or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or a combination thereof having a *fire-resistance rating* of not less than that determined in accordance with Section 707.3.10.

909.20.2 Construction. The *smokeproof enclosure* shall be separated from the remainder of the *building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance rating* requirements for floor assemblies.

909.20.6.1 Ventilation systems. *Smokeproof enclosure* ventilation systems shall be independent of other *building* ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the *building* and directly connected to the *smokeproof enclosure* or connected to the *smokeproof enclosure* by ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the *smokeproof enclosure* with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the *building* if separated from the remainder of the *building*, including other mechanical equipment, by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

Exception:

1. Control wiring and power wiring located outside of a 2-hour *fire barrier* construction shall be protected using any one of the following methods:
   1.1. Cables used for survivability of required critical circuits shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.
   1.2. Where encased with not less than 2 inches (51 mm) of concrete.
   1.3. *Electrical circuit protective systems* shall have a *fire-resistance rating* of not less than 2 hours. *Electrical circuit protective systems* shall be installed in accordance with their listing requirements.

913.2.1 Protection of fire pump rooms. Fire pumps shall be located in rooms that are separated from all other areas of the *building* by 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~2-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. **Exceptions:**

1. In other than *high-rise buildings*, separation by not less than 1-hour *fire barriers* ~~constructed in accordance with Section 707~~ or ~~1-hour~~ *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, shall be permitted in *buildings* equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Separation is not required for fire pumps physically separated in accordance with NFPA 20.

1009.6.4 Separation. Each *area of refuge* shall be separated from the remainder of the *story* by a *smoke barrier* ~~complying with Section 709~~ or a *horizontal exit* complying with Section 1026. Each *area of refuge* shall be designed to minimize the intrusion of smoke. **Exceptions:**

1. *Areas of refuge* located within an enclosure for *interior exit stairways* complying with Section 1023.
2. *Areas of refuge* in outdoor *facilities* where *exit access* is essentially open to the outside.

1023.2 Construction. Enclosures for interior exit *stairways* and *ramps* shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of *stories* connected by the interior exit *stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosures for interior *exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. **Exceptions:**

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.
3. *Interior exit stairways* in accordance with Section 510.2.

1023.3.1 Extension. Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by ~~a~~ *fire* barriers ~~*barrier* constructed in accordance with Section 707~~ or ~~a~~ *horizontal* assemblies ~~*assembly* constructed in accordance with Section 711~~, or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited. **Exceptions:**

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4.

1023.12.1 Termination and extension. A *smokeproof enclosure* shall terminate at an *exit discharge* or a *public way*. The *smokeproof enclosure* shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. The *exit passageway* shall be without openings other than the *fire door assembly* required by Section 1023.3.1 and those necessary for egress from the *exit passageway*. The *exit passageway* shall be separated from the remainder of the *building* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both. **Exceptions:**

1. Openings in the *exit passageway* serving a *smokeproof enclosure* are permitted where the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*, and openings are protected as required for access from other floors.
2. The *fire barrier* separating the *smokeproof enclosure* from the *exit passageway* is not required, provided that the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*.
3. A *smokeproof enclosure* shall be permitted to egress through areas on the *level of exit discharge* or vestibules as permitted by Section 1028.

1024.3 Construction. *Exit passageway* enclosures shall have walls, floors and ceilings of not less than a 1-hour *fire-resistance rating*, and not less than that required for any connecting *interior exit stairway* or *ramp*. Exit passageways shall be constructed as *fire barriers* ~~in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both.

1026.2 Separation. The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by ~~a *fire wall,* complying with Section 706; or by a *fire barrier* complying with Section 707 or a *horizontal assembly* complying with Section 711, or both~~ not less than 2-hour fire walls, fire barriers or horizontal assemblies, or a combination thereof. ~~The minimum *fire-resistance rating* of the separation shall be 2 hours.~~ Opening protectives in horizontal *exits* shall also comply with Section 716. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

Exception: A *fire-resistance rating* is not required at horizontal *exits* between a *building* area and an above-grade *pedestrian*

walkway constructed in accordance with Section 3104, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* ~~constructed in accordance with Section 708~~. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

1030.1.1.1 Spaces under grandstands and bleachers. Spaces under *grandstands* or *bleachers* shall be separated by not less than 1-hour *fire barriers* ~~complying with Section 707 and~~ or *horizontal assemblies* ~~complying with Section 711 with not less than 1-hour *fire-resistance-rated* construction~~, or both. **Exceptions:**

1. Ticket booths less than 100 square feet (9.29 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (92.9 m^2) or less in area and equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

3005.4 Machine rooms, control rooms, machinery spaces, and control spaces. The following rooms and spaces shall be enclosed with *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both:

1. Machine rooms.
2. Control rooms.
3. Control spaces.
4. Machinery spaces outside of the hoistway enclosure.

The *fire-resistance rating* shall be not less than the required rating of the hoistway enclosure served by the machinery. Openings in the *fire barriers* shall be protected with assemblies having a *fire protection rating* not less than that required for the hoistway enclosure doors.

Exceptions:

1. For other than fire service access elevators and occupant evacuation elevators, where machine rooms, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the *fire barriers* ~~constructed in accordance with Section 707~~ or *horizontal assemblies* ~~constructed in accordance with Section 711~~, or both, shall be permitted to be reduced to a 1-hour *fire-resistance rating*.
2. For other than fire service access elevators and occupant evacuation elevators, in *buildings* four *stories* or less above *grade plane* where machine room, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the machine room, machinery spaces, control rooms and control spaces are not required to be fire-resistance rated.

3006.3 Elevator hoistway door protection. Where Section 3006.2 requires protection of the elevator hoistway doors, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway doors from each floor with *fire partitions* ~~in accordance with Section 708~~. In addition, doors protecting openings in the fire partitions shall comply with Section 716.2.2.1. Penetrations of the fire partitions by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway doors from each floor by *smoke partitions* ~~in accordance with Section 710~~. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the *smoke partitions* by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors or other devices shall be provided at each elevator hoistway door in accordance with Section 3002.6. Such doors or other devices shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.
5. A *smoke-protective curtain assembly for hoistways* shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such curtain assemblies shall comply with the smoke and draft control requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal. Such curtain assemblies shall be equipped with a control unit *listed* to UL 864. Such curtain assemblies shall comply with Section 2.11.6.3 of ASME A17.1/CSA B44. Installation and maintenance shall be in accordance with NFPA 105.

3104.5.1 Fire barriers. *Pedestrian walkways* shall be separated from the interior of the *building* by not less than 2-hour *fire barriers* constructed in accordance with ~~Section~~ Sections 707 and ~~Sections~~ 3104.5.1.1 through 3104.5.1.3.

2024 International Fire Code

Revise as follows:

[BF] 909.20.2 Construction. The *smokeproof enclosure* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*~~, or both. Openings are not permitted other than the required *means of egress* doors. The vestibule shall be separated from the *stairway* or *ramp* by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both. The open exterior balcony shall be constructed in accordance with the *fire-resistance-rating* requirements for floor assemblies.

[BF] 909.20.5.1 Ventilation systems. *Smokeproof enclosure* ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the *smokeproof enclosure* or connected to the *smokeproof enclosure* by ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the *smokeproof enclosure* with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*~~, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the *International Building Code*~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the *International Building Code*,~~ or both.

Exception: Control wiring and power wiring located outside of a 2-hour *fire barrier* construction shall be protected using any one of the following methods:

1. Cables used for survivability of required *critical circuits* shall be *listed* in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

[BE] 1023.2 Construction. Enclosures for *interior exit stairways* and *ramps* shall be constructed as *fire barriers* ~~in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code,~~ or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosure for *interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. **Exceptions:**

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8 of the International Building Code.
2. *Interior exit stairways* within an atrium enclosed in accordance with Section 404.6 of the International Building Code.
3. *Interior exit stairways* in accordance with Section 510.2 of the *International Building Code*.

[BE] 1023.3.1 Extension. Where *interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*, the *interior exit stairway* and *ramp* shall be separated from the *exit passageway* by ~~a~~ *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or ~~a~~ *horizontal assemblies* ~~*assembly* constructed in accordance with Section 711 of the International Building Code,~~ or both. The *fire-resistance rating* shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door* assembly complying with Section 716 of the International Building Code shall be installed in the *fire barrier* to provide a *means of egress* from the *interior exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door*

assembly are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4 of the International Building Code.

[BE] 1023.12.1 Termination and extension. A *smokeproof enclosure* shall terminate at an *exit discharge* or a *public way*. The *smokeproof enclosure* shall be permitted to be extended by an *exit passageway* in accordance with Section 1023.3. The *exit passageway* shall be without openings other than the *fire door assembly* required by Section 1023.3.1 and those necessary for egress from the *exit passageway*. The *exit passageway* shall be separated from the remainder of the building by not less than 2-hour *fire barriers* ~~constructed in accordance with Section 707 of the International Building Code~~ or *horizontal assemblies* ~~constructed in accordance with Section 711 of the International Building Code,~~ or both.

Exceptions:

1. Openings in the *exit passageway* serving a *smokeproof enclosure* are permitted where the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*, and openings are protected as required for access from other floors.
2. The *fire barrier* separating the *smokeproof enclosure* from the *exit passageway* is not required, provided that the *exit passageway* is protected and pressurized in the same manner as the *smokeproof enclosure*.
3. A *smokeproof enclosure* shall be permitted to egress through areas on the *level of exit discharge* or vestibules as permitted by Section 1028.

[BE] 1026.2 Separation. The separation between buildings or refuge areas connected by a *horizontal exit* shall be provided by ~~a *fire wall* complying with Section 706 of the International Building Code; or by a *fire barrier* complying with Section 707 of the International Building Code or a *horizontal assembly* complying with Section 711 of the International Building Code, or both.~~ not less than 2-hour fire walls, fire barriers or horizontal assemblies, or a combination thereof. ~~The minimum *fire-resistance rating* of the separation shall be 2 hours.~~ Opening protectives in *horizontal exits* shall also comply with Section 716 of the International Building Code. Duct and air transfer openings in a *fire wall* or *fire barrier* that serves as a *horizontal exit* shall also comply with Section 717 of the International Building Code. The *horizontal exit* separation shall extend vertically through all levels of the building unless floor assemblies have a *fire-resistance rating* of not less than 2 hours and do not have unprotected openings.

Exception: A *fire-resistance rating* is not required at *horizontal exits* between a building area and an above-grade pedestrian walkway constructed in accordance with Section 3104 of the International Building Code, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as *fire barriers* shall be continuous from *exterior wall* to *exterior wall* so as to divide completely the floor served by the *horizontal exit*.

[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:

   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:

   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.

   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* ~~constructed in accordance with Section 708 of the International Building Code~~. **Exception:** The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

[BE] 1030.1.1.1 Spaces under grandstands and bleachers. Spaces under *grandstands* or *bleachers* shall be separated by <u>not less than 1-hour</u> *fire barriers* ~~complying with Section 707 of the International Building Code~~ and *horizontal assemblies* ~~complying with Section 711 of the International Building Code with not less than 1-hour *fire-resistance-rated* construction~~ <u>, or both .</u>

Exceptions:

1. Ticket booths less than 100 square feet (9 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (93 m^2) or less in area and equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

Reason: This proposal is designed to provide consistency with references to fire-resistance-rated construction requirements. The 2024 IBC makes multiple requirements for fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions. The format of the requirements is not consistent, but more importantly, there is really no need to reference the section regulating these components every time a requirement is made. These terms are all defined terms and each component has a specific section that it must comply with. Where Section 426.1.7 requires a tire buffing room to be separated from the remainder of the building by 1-hour fire barriers, it is understood that the fire barrier must comply with the code. If the fire barrier does not comply with the code, it is not a fire barrier.

For example, the IBC does not state provide “exit doors in accordance with Section 1010” every time an exit door is required. Such language is not necessary and the code does not need to state it, because if the door does not comply then it is not considered an exit door.

Currently, the IBC does not reference the specific sections in the following locations:
404.6, 407.5.4, 408.6.1, 412.4.1, 415.9.1.2, 415.11.1.6, 415.11.7.4, 420.6, 426.1.7, 507.9, 510.2, 510.5, 510.6, 707.3.10, 714.4, 714.5.4, 717.5.1.1, 909.6, 909.6.2, 909.18.6, 910.3.2, 911.1.6, 1026.2, 3007.6.2, 3008.6.2
None of these sections refer back to Chapter 7, but they all seem to work effectively without that reference.

This proposal intends to eliminate the multiple phrases “constructed in accordance with Section 70X” because they are not needed, and are basically redundant. The code proves that they are not needed by the number of references where the section for construction is not included.

Even where a section in Chapter 7 is referenced, a number of references are worded differently. Some of those sections include:

- **402.4.2.2** Anchor building separation. …fire walls complying with Section 706.
- **420.2** Separation walls. …fire partitions in accordance with Section 708
- **422.2** Separation walls. …fire partitions installed in accordance with Section 708
- **716.3.2.1.1** Where 3/4-hour-fire-protection window assemblies permitted. …fire partitions designed in accordance with Section 708
- **1026.2** Separation. …fire wall complying with Section 706; or by a fire barrier complying with Section 707 or a horizontal assembly complying with Section 711, or both.

This code change is editorial and makes no change in code application. This proposal simplifies the code language and provides consistency in the requirements for fire walls, fire barriers, smoke barriers, etc.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is long, but it is entirely editorial. There is no change in code application or code requirements.

FS21-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee has concerns with "where required by this code". The committee indicated that the proposal needs to maintain the authority between codes. The committee agreed with some of the proposed text for example, the IBC does not state provide “exit doors in accordance with Section 1010” every time an exit door is required. Such language is not necessary and the code does not need to state it, because if the door does not comply then it is not considered an exit door (Vote: 10-1).

FS21-24 Part I

Individual Consideration Agenda

Comment 1:

IBC: 706.1, 707.1, 709.1, 710.1, 711.1

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

706.1 General. *Fire walls* ~~required by this code or the *International Fire Code*~~ shall be constructed in accordance with Sections 706.2 through 706.11. The extent and location of such *fire walls* shall provide a complete separation. Where a *fire wall* separates occupancies that are required to be separated by a *fire barrier* wall, the most restrictive requirements of each separation shall apply.

707.1 General. *Fire barriers* ~~required by this code or the *International Fire Code*~~ shall comply with this section.

Revise as follows:

709.1 General. Vertical and horizontal *smoke barriers* ~~required by this code or the *International Fire Code*~~ shall comply with this section.

710.1 General. *Smoke partitions* ~~required by this code or the *International Fire Code*~~ shall comply with this section.

711.1 General. *Horizontal assemblies* ~~required by this code or the *International Fire Code*~~ shall comply with Section 711.2. Nonfire-resistance-rated floor and *roof assemblies* shall comply with Section 711.3.

Reason: This item was Disapproved at CAH 1. FS21-24 Part II was Approved as Modified at CAH 1.

The only negative comment about the proposal was with regard to whether the IFC could require fire barriers, fire walls, etc. Without entering into that argument, this comment has been revised to correlate all of 5 charging sections dealing with each type of fire-rated or smoke-rated assembly so that they do not reference which code the requirement comes from. The issue is if it is a fire barrier, how is it constructed...Section 707 provides those provisions; and Section 706 for fire walls, etc.

The language used in each section matches the original language in Section 709.1 for smoke barriers, "vertical and horizontal smoke barriers shall comply with this section." Very simple; and each section conveys the same message.

Then throughout the code, where the code refers to a fire wall, for example in IBC Section 402.4.2.2, the code user refers back IBC Section 406 which provides the criteria on construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in code application or code requirements.

Comment (CAH2)# 794

FS23-24

IBC: 706.3

Proposed Change as Submitted

Proponents: David Bueche, Hoover Treated Wood Products, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Building Code

Revise as follows:

706.3 Materials. *Fire walls* shall be of any *approved* noncombustible materials. **Exception:** *Buildings* of Type III or V construction.

Reason: Type III construction allows use of untreated combustible materials in all locations except in a fire wall or an exterior wall. The code already allows 2 hour exterior wall to be constructed of fire-retardant-treated wood in lieu of noncombustible materials in Type III construction. It makes sense to extend that to a fire wall as the performance would be no different. This code change eliminates any potential conflict with Section 602.3.

Furthermore, building a fire wall using a completely different construction method such as concrete or masonry not employed in the remainder of the building requires a specialty contractor. This may result in scheduling and coordination conflicts and delays that necessarily result in higher costs.

Note that the fire resistances listed in Table 706.4 remain unchanged.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

The addition of fire-retardant-treated wood as an option to this section of the code may decrease the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

FS23-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as requested by the proponent to work on the proposal for the CAH2 (Vote: 11-0).

FS23-24

Individual Consideration Agenda

Comment 1:

IBC: 706.3

Proponents: David Bueche, Hoover Treated Wood Products, Hoover Treated Wood Products (dbueche@frtw.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

706.3 Materials. *Fire walls* shall be of any *approved* noncombustible materials. ~~**Exception**~~ **Exceptions:**

1. *Buildings* of ~~Type III or~~ V construction.
2. *Fire-retardant-treated wood* complying with section 2303.2 shall be permitted in buildings of Type III construction.

Reason: This clarifies that the intent is to allow fire-retardant-treated wood to be used in fire walls of Type III construction. This type of construction allows use of untreated combustible materials in all locations except in a fire wall or an exterior wall. The code already allows 2 hour exterior walls to be built of fire-retardant-treated wood in lieu of noncombustible materials in Type III construction. It makes sense to extend that to a fire wall as the performance would be no different. This code change eliminates any potential conflict with Section 602.3.

Furthermore, building a fire wall using a completely different construction method such as concrete or masonry not employed in the remainder of the building requires a specialty contractor. This may result in scheduling and coordination conflicts and delays that necessarily result in higher costs.

Note that the fire resistances listed in Table 706.4 remain unchanged.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

The addition of fire-retardant-treated wood as an option to this section of the code may decrease the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

Comment (CAH2)# 618

FS24-24

IBC: 706.5

Proposed Change as Submitted

Proponents: Tim Pate, City and County of Broomfield, Colorado Chapter Code Development Committee (tpate@broomfield.org)

2024 International Building Code

Revise as follows:

706.5 Horizontal continuity. *Fire walls* shall be continuous from *exterior wall* to *exterior wall* and shall extend not less than 18 inches (457 mm) beyond the exterior surface of *exterior walls*. **Exceptions:**

1. *Fire walls* shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided that the *exterior wall* has a *fire-resistance rating* of not less than 1 hour for a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than $^{3}/_{4}$ hour.
2. *Fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* or noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided that the sheathing, siding or other exterior noncombustible finish extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
3. *Fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* or noncombustible exterior sheathing where the *building* on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: This proposal is to add fire retardant treated wood in addition to the noncombustible sheathing in 706.5 exception 2 and 3. This would be equivalent to 706.6 #4 for vertical continuity which requires fire-retardant-treated wood roof sheathing for roof sheathing or installing the ⅝" type X drywall to underside of regular roof sheathing.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease cost of construction since it is adding another type of product to meet the code

FS24-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disagreed with the proposed text to exceptions 2 and 3 in Section 706.5 for horizontal continuity. The committee has an issue with adding "fire-retardant-treated-wood" before the noncombustible exterior sheathing (Vote: 10-1).

FS24-24

Individual Consideration Agenda

Comment 1:

IBC: 706.5

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

706.5 Horizontal continuity. *Fire walls* shall be continuous from *exterior wall* to *exterior wall* and shall extend not less than 18 inches (457 mm) beyond the exterior surface of *exterior walls*. **Exceptions:**

1. *Fire walls* shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided that the *exterior wall* has a *fire-resistance rating* of not less than 1 hour for a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than $^{3}/_{4}$ hour.
2. *Fire walls* shall be permitted to terminate at the interior surface of ~~*fire-retardant-treated wood* or~~ noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided that the sheathing, siding or other exterior noncombustible finish extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
3. *Fire walls* shall be permitted to terminate at the interior surface of ~~*fire-retardant-treated wood* or~~ noncombustible exterior sheathing where the *building* on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.
4. In buildings of Type III, IV-HT or V construction, *fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* exterior sheathing provided that *fire-retardant-treated wood* exterior sheathing extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
5. In buildings of Type III, IV-HT or V construction, *fire walls* shall be permitted to terminate at the interior surface of *fire-retardant-treated-wood* exterior sheathing where the *building* on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

Reason: The testimony at Committee Action Hearing #1 raised concerns with fire-retardant-treated wood (FRTW) exterior sheathing being used in any type of construction as a replacement for noncombustible exterior sheathing. Direction was offered to model this code change after language used in Section 706.6, Exception #4, which limited the use of FRTW roof sheathing to buildings of Type III, IV and V construction when terminating a fire wall vertically. This proposed comment on FS24-24 mirrors that option to provide termination of a fire wall horizontally at FRTW sheathing only in Types III, IV-HT and V construction. Additional testimony mentioned that we would be weakening a building by permitting FRTW exterior sheathing on many buildings, but by limiting the types of construction, only buildings which permit FRTW exterior sheathing are included, so there would be no weakening of building elements in these instances.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The original proposal was also considered editorial because it is just adding an additional method for code compliance.

Comment (CAH2)# 38

FS26-24

IBC: 707.3, 707.3.12 (New)

Proposed Change as Submitted

Proponents: Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (micah.chappell@seattle.gov); Ardel Jala, Seattle Dept of Construction & Inspections, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov)

2024 International Building Code

707.3 Fire-resistance rating. The *fire-resistance rating* of *fire barriers* shall comply with this section.

Add new text as follows:

707.3.12 Energy Storage Systems. The *fire barrier* separating *energy storage systems* from other spaces in the building shall have a minimum 2-hour *fire-resistance rating.*

Reason: The 2024 International Fire Code (IFC) requires fire barriers provide a 2-hour fire resistance rating when separating areas containing energy storage systems (ESS), from other areas of the building, and has a pointer to Section 707 of the International Building Code (IBC). This proposed additional language to Section 707.3 of the IBC provides the minimum fire resistance rating required for those fire barriers aligning the IBC with IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IFC already required the rated separation and this code change proposal only aligns the IBC with the existing requirement.

FS26-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee agreed that this is a needed clarification. However, the committee suggested to the proponent to work on a scoping statement between IBC and IFC. The committee also suggested providing limitations of implementation to the added text to avoid unintended consequences (Vote: 9-1).

FS26-24

Individual Consideration Agenda

Comment 1:

IBC: 707.3.12

Proponents: Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections

(micah.chappell@seattle.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

707.3.12 Energy Storage Systems. Where required by the *International Fire Code* ~~T~~the *fire barrier* separating *energy storage systems* from other spaces in the building shall have a minimum 2-hour *fire-resistance rating*.

Reason: We request your approval of this modification that was requested by the Committee.

This modification mimics the language the Committee approved for FS34-24-Chappell-MP1 that provides a reference to the Fire Code were the requirement originates for energy storage systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides a reference to the fire code, no cost impact to the original proposal.

Comment (CAH2)# 623

FS31-24

IBC: 709.9 (New)

Proposed Change as Submitted

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org); William Koffel, Koffel Associates, Inc., California Solar and Storage Association (CALSSA) (wkoffel@koffel.com)

2024 International Building Code

Add new text as follows:

709.9 Separating smoke compartments. Where the horizontal assembly is required to be a smoke barrier, the assembly shall comply with Section 909.

Reason: The code does not completely address where the floors (horizontal assemblies) are required to also be designed as smoke barriers. Section 711.2.4.4 sends you to Section 709 for smoke barriers that are horizontal assemblies. Smoke compartments are required in ambulatory care, Group I-1 Condition 2, Group I-2 and Group I-3. Pressurized stairways also use horizontal smoke barriers. As indicated in Section 422.3, smoke barriers shall be provided on any story containing an ambulatory care facility which is greater than 10,000 sq. ft. in area. The creation of smoke compartments is required to allow a protect-in-place environment. These compartments allow staff a safer environment to stabilize the care recipients before evacuation and protection for fire personnel who may have to evacuate both care recipients and staff. The requirement for a smoke barrier is based solely on a story-by-story basis without consideration of fire-resistance ratings for the floor assemblies. As such, a smoke barrier is not required for the floor assemblies.

Since the primary performance of smoke barriers is to achieve protection on the fire floor, the supporting construction is not required to provide the same degree of fire resistance for buildings of Types IIB, IIIB and VB construction as specified in Section 709.4. These three construction types are identified since the floor construction is not otherwise required to have a fire-resistance rating and it is not considered essential to require fire-resistance-rated floor construction due to the floor supporting a smoke barrier. As such, since the building in question is of Type IIB construction, the supporting construction for the smoke barrier is not required to have a fire-resistance rating.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification with no change to construction requirements. Please refer to the reason statement.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee deemed the proposed code change is needed to clarify the requirements for separating smoke compartments. The committee agreed that the pointer to section 909 is needed where the horizontal assembly is required to be a smoke barrier (Vote: 9-2).

FS31-24

Individual Consideration Agenda

Comment 1:

Proponents: Ajay Prasad, Jensen Hughes, Self (aprasad@jensenhughes.com) requests Disapproved

Reason: This code change is not necessary. The intent of the change was stated as addressing where floors (horizontal assemblies) are required to be smoke barriers. The code change would require horizontal assemblies as smoke barriers to comply with Section 909 for smoke control systems. Section 909 broadly covers mechanical and passive smoke control systems.

Section 709 covers both vertical and horizontal smoke barriers but the scoping requirement for smoke barriers originates in other sections. Section 407.5 only requires vertical smoke barriers (i.e., walls) to comply with 709.Section 407.5.5 requires horizontal assemblies supporting smoke barriers to resist the movement of smoke but this section does not reference Section 709. Since smoke compartment in institutional occupancies is primarily passive, the current provisions in Section 709 are sufficient to limit the movement of smoke without the need to reference Section 909.

Section 709.4.1 requires continuity of smoke barrier walls.Section 709.5 requires openings in smoke barriers to be protected per Section 716 but has key exceptions for cross-corridor doors in Groups I-1, I-2 and ambulatory care facilities

Sections 709.6, 709.7, and 709.8 address with penetrations, joints, and duct/air transfer openings respectively. Specifically, limiting smoke spread through horizontal smoke barriers is already covered by references in Section 709. Section 709.6 references 714. 714.5.4 for penetrations of smoke barriers requires a L rating. Section 709.7 references 715. 715.9 requires L ratings for joints in smoke barriers. Section 709.8 references 717.5.5 which requires smoke dampers in duct/ATO penetrations of smoke barriers.

A code change to 407.5.5 to reference Section 709 is a more straightforward solution that should be considered by the submitters.

Proposed §709.10 would include compliance with §909.5 for smoke barrier construction which states, “Smoke barriers required for passive smoke control and a smoke control system using the pressurization methods shall comply with Section 709.” This is a circular reference. Furthermore, it could be read as only applying to both because of the “and: conjunction. Section 909.5 requires calculation of the maximum allowable leakage areas. Section 909.5.2 requires verification of passive smoke control through methods such as door fan testing or other methods approved by the code official. The forms of smoke protection specified in Section 709 for horizontal assemblies would be covered by special inspections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 117

FS35-24

IBC: 711.2.4, 711.2.4.7 (New), 711.3, 711.3.3 (New)

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

711.2.4 Fire-resistance rating. The *fire-resistance rating* of *horizontal assemblies* shall comply with Sections 711.2.4.1 through ~~711.2.4.6~~ 711.2.4.7 but shall be not less than that required by the *building* type of construction.

Add new text as follows:

711.2.4.7 Occupiable roofs. Occupiable roofs shall have penetrations protected in accordance with Section 714 and joints and voids protected in accordance with Section 715. Skylights shall not be located within the occupied area of occupiable roofs.

711.3 Nonfire-resistance-rated floor and roof assemblies. Nonfire-resistance-rated floor, floor/ceiling, roof and roof/ceiling assemblies shall comply with Sections 711.3.1 and ~~711.3.2~~ 711.3.3.

Add new text as follows:

711.3.3 Occupiable roofs. Occupiable roofs shall have penetrations, joints and voids protected with materials or systems that prevent the spread of fire through the roof assembly. Skylights shall not be located within the occupied area of occupiable roofs.

Reason: When a roof becomes occupied or occupiable, the safety of the occupants on the roof becomes the same as if they were standing on the floor below. Without a fire-resistance rating and protected penetrations, joints and voids along with restrictions for skylights in the occupied roof area, the occupants are exposed to a fire and life safety risk. When a roof becomes occupied or occupiable, the safety of the occupants on the roof becomes the same as if they were standing on the floor below. Without a fire-resistance rating and protected penetrations, joints and voids, along with regulations for skylights in the occupied roof area, the occupants are exposed to a fire and life safety risk.

The proposal builds on the concept of occupiable roofs, added to the 2024 IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The estimated cost is $35 - $50 per installed firestop system and $35 - $50 per lineal ft. of installed joint sytems.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate includes materials and labor costs for any type of penetration system and fire-resistant joint system through a roof assembly. The total cost for any specific building will depend upon the number of penetrations and joint systems.

FS35-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposal is unnecessary since the code already addresses this issue (Vote: 6-5).

FS35-24

Individual Consideration Agenda

Comment 1:

IBC: 711.2.4, 711.2.4.7, 711.3, 711.3.3

Proponents: Bill McHugh, CM Services, Firestop Contractors International Association (bill@mc-hugh.us); William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

711.2.4 Fire-resistance rating. The *fire-resistance rating* of *horizontal assemblies* shall comply with Sections 711.2.4.1 through 711.2.4.7 but shall be not less than that required by the *building* type of construction.

711.2.4.7 Occupiable roofs. Occupiable roofs shall have penetrations protected in accordance with Section 714 and joints ~~joints and voids~~ protected in accordance with Section 715. Skylights shall not be located within the occupied area of occupiable roofs.

711.3 Nonfire-resistance-rated floor and roof assemblies. Nonfire-resistance-rated floor, floor/ceiling, roof and roof/ceiling assemblies shall comply with Sections 711.3.1 and 711.3.3.

711.3.3 Occupiable roofs. Occupiable roofs shall have penetrations and joints~~, joints and voids~~ protected with materials or systems that prevent the spread of fire through the roof assembly. Skylights shall not be located within the occupied area of occupiable roofs.

Reason: Occupiable rooftops change the roof from a weather resistant environment to both a weather resistant surface and life safety protection system. Fire from below should not cause rooftop occupants more risk than if they were standing on the floor below the roof. Even if a one story roof, people on the rooftop need protection from fire poking through penetrations, joints, and skylights - a huge opening with both fire and safety risks. This concept of occupiable rooftop regulation is relatively new to the code having been defined last cycle in the '24 IBC.

In Orlando, there were requests to clarify where protection is to be required. While the title of section 715 is Joints and Voids, there is no definition for voids in the IBC's Chapter 2, which may have caused confusion. Therefore, the word 'void' has been removed from the proposal.

At the Committee Action Hearings in Orlando, there was testimony by the Extruded Polystyrene Insulation Association (XPSA) others, that seemed misleading. When a roof assembly becomes fire-resistance-rated, it does not mean firestopping is now required in joints or voids between pieces or sections of the overburden walking surface.

The reason is that the fire-resistance test is conducted on the horizontal assembly from the bottom side for a specified time period. The horizontal assembly consists of the roof deck, the roof covering including the roof insulation, a roof membrane, and some protection beneath the roof deck. Joints (and voids) and penetrations, are protected at that fire-resistance-rated assembly – below the insulation and overburden. There is no need to protect joints between adjacent pieces of sections of the overburden walking surface.

Please reconsider this proposal to approved as modified.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated cost is $35 - $50 per installed firestop system and $35 - $50 per lineal ft. of installed joint systems.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimate includes materials and labor costs for any type of penetration system and fire-resistant joint system through a roof assembly. The total cost for any specific building will depend upon the number of penetrations and joint systems.

Comment (CAH2)# 452

FS36-24

IBC: 712.1.9

Proposed Change as Submitted

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Building Code

Revise as follows:

712.1.9 Two-story openings. In other than Groups I-2 and I-3, a vertical opening that is not used as one of the applications specified in this section shall be permitted if the opening complies with all of the following items:

1. Does not connect more than two *stories.*
2. Does not penetrate a *horizontal assembly* that separates *fire areas* or *smoke barriers* that separate *smoke compartments*.
3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
4. Is ~~not open to~~ separated from a *corridor* in Group I and R occupancies by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or by *smoke partitions* complying with Section 710. In addition, doors protecting openings in *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2.
5. Is ~~not open to~~ separated from a *corridor* on nonsprinklered floors by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or by *smoke partitions* complying with Section 710. In addition, doors protecting openings in *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2 .
6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required *shaft enclosures.*

Reason: The words "not open to" in items #4 and #5 are not defined or described. "Not open to" could be interpreted to mean not atmospherically connected and separated by some physical barrier without openings. Or "not open to" could mean that openings are allowed, but there are means of controlling the passage of smoke between the two-story opening and the adjacent corridors.

This proposal eliminates the ambiguity by replacing the words "not open to" with specific provisions that define when a two-story opening is "not open to" a corridor.

Since the intent is to eliminate the passage of smoke from a two-story opening into a corridor under the stated circumstances, providing a means of controlling the smoke is the only option, and the provisions for fire-resistance-rated assemblies and smoke partitions offer that capability.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

For jurisdictions requiring some form of physical separation with no openings (i.e., doors and windows) between the two-story opening and a corridor, this change would allow the designer more flexibility, which may or may not reduce cost. If jurisdictions interpret this section to mean that corridors can open into two-story spaces as long as a door with a closer is provided, then this change would add some cost due to the minimal protection required by a smoke partition between the corridor and the two-story space that requires smoke and draft control for any doors. If the separation is already provided by a fire-resistance-rated assembly through some other code requirement, there would be no additional cost since openings would be required to be protected.

Estimated Immediate Cost Impact Justification (methodology and variables):

If minimal protection is required, the cost would be $65 to $100 per opening for "S" labels on the doors and frames and smoke seals

around the door perimeter. The majority of the cost will be for the "S" labels (about $40 for the door and frame) and $25 for the seals for a standard 3' by 7' door. Double doors will be at the higher end for the additional label and extra length of perimeter to seal.

FS36-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language still needs more work. The proposed text does not specify fire-resistance-rating. The committee also recommended looking into Section 509.4.2 (Vote: 11-0).

FS36-24

Individual Consideration Agenda

Comment 1:

IBC: 712.1.9

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

712.1.9 Two-story openings. In other than Groups I-2 and I-3, a vertical opening that is not used as one of the applications specified in this section shall be permitted if the opening complies with all of the following items:

1. Does not connect more than two *stories.*
2. Does not penetrate a *horizontal assembly* that separates *fire areas* or *smoke barriers* that separate *smoke compartments*.
3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
4. Is separated from a *corridor* in Group I and R occupancies ~~by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or~~ by *smoke partitions* ~~complying with Section 710. In addition, doors~~ Doors protecting openings in *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. ~~Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2.~~
5. Is separated from a *corridor* on nonsprinklered floors ~~by a fire-resistance-rated assembly tested under ASTM E119 or UL 263, or~~ by *smoke partitions* ~~complying with Section 710. In addition, doors~~ Doors protecting openings in *smoke partitions* shall comply with Sections 710.5.2.2 and 710.5.2.3. ~~Doors in other fire-resistance-rated assemblies shall comply with Section 716.2.2.~~
6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required *shaft enclosures.*

Reason: The premise of the original proposal's reason statement is still valid. However, in response to opposition and committee comments, the confusing language referencing "fire-resistance-rated assemblies" and "other fire-resistance-rated assemblies" has been deleted for simplicity. Therefore, only the basic requirement of providing a smoke partition is stated.

Thus, if a wall separating the two-story opening from other building areas is required to have an assembly with more restrictive requirements, Section 702.1 would come into play. For example, suppose the wall separating a corridor from a two-story opening in a Group R occupancy is required to be a fire barrier for occupancy separation. In that case, the wall must conform to the more restrictive requirements of a fire barrier.

Additionally, references to Section 710 were deleted as superfluous since the assemblies mentioned in item #2 do not include references to their respective code sections.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The immediate cost impact remains as stated in the original proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

The justification remains as stated in the original proposal.

Comment (CAH2)# 767

FS41-24

IBC: 714.2 (New), 715.2 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Add new text as follows:

714.2 System variations. Where variations between the installed system and the tested through- or membrane-penetration firestop system exist, sufficient documentation shall be provided to the building official to show that the required ratings are not reduced.

715.2 System variations. Where variations between the installed system and the tested fire-resistant joint system, perimeter fire containment system or continuity head-of wall system exist, sufficient documentation shall be provided to the building official to show that the required ratings are not reduced.

Reason: Despite the fact there are over 10,000 individual firestop systems, fire-resistant joint systems, perimeter fire containment systems and continuity head-of-wall systems, each with multiple construction variations tested as required by the IBC, field conditions frequently occur for which there are no tested system available. These two new sections are intended to address how these unique installations need to be addressed between the design professional, the contractor and the code official. The language proposed emulates the language contained in existing Section 703.2.1.4 other than the fact it addresses all variations and not just supplemental features. For example, it would cover situations where a required component of a tested assembly is not installed, or where some feature not described is installed.

The sufficient documentation required is normally provided in the form of an equivalent firestop system obtained from some knowledgeable party. This process is a necessary and well-established program used on a daily basis in the firestopping industry when not tested systems are available. Industry practice has been to use the equivalent firestop system process only when a tested system is not available.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Alternative means and methods submissions are costly to prepare. However, it has been common practice for AHJ's to accept either a system variation (e.g. engineering judgment) provided by the manufacturer, or a system variation stamped by a professional engineer to cover the installation. Manufacturers provide system variations at no cost. Even where an AHJ requires an Engineer's seal, this is still less costly than an alternative means and methods submission.

Using system variations as proposed will eliminate the need for a costly alternative means and methods submittal. Manufacturers provide system variations (e.g. engineering judgments) at no cost. If an AHJ requires an Engineer's seal, the cost can range is from $1000 to $2000 depending on the area of the country.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee indicated that the proposed sections are needed. However, the committee suggested improving the proposed text. The committee wanted to see more clarification to the text, for example: "sufficient documentation", and "an installed system". The committee recommended adding "listed" systems (Vote: 7-4).

FS41-24

Individual Consideration Agenda

Comment 1:

IBC: 714.2, 715.2

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

714.2 System variations. Where a *listed* ~~variations between the installed system and the tested~~ through- or membrane-penetration firestop system cannot be installed in compliance with the listing, the code officials is authorized to accept modifications where ~~exist, sufficient~~ documentation ~~shall be~~ is provided to the ~~building~~code official demonstrating that the firestop system will perform as intended. ~~to show that the required ratings are not reduced.~~

715.2 System variations. Where a *listed* ~~variations between the installed system and the tested~~ fire-resistant joint system, perimeter fire containment system or continuity head-of wall system cannot be installed in compliance with the listing, the code official is authorized to accept modifications where ~~exist, sufficient~~ documentation ~~shall be~~ is provided to the ~~building~~ code official demonstrating that the system will perform as intended. ~~to show that the required ratings are not reduced.~~

Reason:
During Committee Action Hearing No. 1, the committee indicated the proposed new sections are needed and offered suggestions for improvement. This comment addresses the committee's suggestions as noted;

1. Removed the word "installed system" to eliminate the confusion on if the system is already installed.
2. Replaced the word "tested" with "listed" to clearly show the variation is in the listed system.
3. Made clear that supporting documentation acceptable to the code official shall be provided which allows the code official to approve the source of the documentation and the necessary information within the documentation.

Despite the fact there are over 10,000 individual firestop systems, fire-resistant joint systems, perimeter fire containment systems and continuity head-of-wall systems, each with multiple construction variations tested as required by the IBC, field conditions frequently occur for which there are no tested system available. These two new sections are intended to address how these unique installations need to be addressed between the design professional, the contractor and the code official. The language proposed emulates the language contained in existing Section 703.2.1.4 other than the fact it addresses all variations and not just supplemental features. For example, it would cover situations where a required component of a tested assembly is not installed, or where some feature not described is

installed. The sufficient documentation required is normally provided in the form of an equivalent firestop system obtained from someknowledgeable party. This process is a necessary and well-established program used on a daily basis in the firestopping industry when not tested systems are available. Industry practice has been to use the equivalent firestop system process only when a tested system is not available.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the FCAC Website

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

Alternative means and methods submissions are costly to prepare. However, it has been common practice for AHJ’s to accept either a system variation (e.g. engineering judgment) provided by the manufacturer, or a system variation stamped by a professional engineer to cover the installation. Manufacturers provide system variations at no cost. Even where an AHJ requires an Engineer's seal, this is still less costly than an alternative means and methods submission.

Using system variations as proposed will eliminate the need for a costly alternative means and methods submittal. Manufacturers provide system variations (e.g. engineering judgments) at no cost. If an AHJ requires an Engineer's seal, the cost can range is from $1000 to $2000 depending on the area of the country.

Comment (CAH2)# 349

FS42-24

IBC: SECTION 202 (New), 714.2, 714.2.1 (New), 715.2, 715.2.3 (New)

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Add new definition as follows:

FIRESTOP IDENTIFICATION DEVICE. A label, placard, or device of any type that identifies the installed firestop system.

714.2 Installation. A *listed penetration firestop* system shall be installed in accordance with the manufacturer's installation instructions and the listing criteria.

Add new text as follows:

714.2.1 Firestop identification devices. Penetration firestop systems shall be permanently identified with a device, label or similar treatment. The device shall be handwritten with permanent ink, or pre-printed, legible tag or label, or format readable by an electronic device and readable from a distance of 24 in. (610 mm) at a 45-degree angle. The device shall at a minimum have the following information:

1. Listing system number or engineering judgement number.
2. Date of Installation
3. Installing company name, contact information.
4. "Warning, Penetration Firestop System - Do Not Remove or Tamper.

Adhesive or mechanically attached Identification devices shall be located within 6 in. (150 mm) below or beside the penetration firestop system edge, on the bottom of a horizontal assembly, or on both sides of a vertical barrier. For multiple penetrations of the same listing number arranged within 6 in. (150 mm) of each other, the device shall be located centered under or within 6 in. (150 mm) to either side of the grouping. Hanging tags shall be attached to the penetrating item with permanent wire, string or plastic tie, within 6 in. (150 mm) of the assembly.

Revise as follows:

715.2 Installation. Systems or materials protecting *joints* and voids shall be installed in accordance with Sections 715.2.1 and ~~715.2.2~~ 715.2.3.

Add new text as follows:

715.2.3 Firestop identification devices. Joint and void protection shall be permanently identified with a device, label or similar treatment. The device shall be handwritten with permanent ink, or pre-printed, legible tag or label, or format readable by an electronic device readable from a distance of 24 in. (610 mm) at a 45-degree angle, both sides of the fire barrier, smoke barrier or fire wall. The device shall at a minimum have the following information:

1. Listing system number or engineering judgement number.
2. Date of Installation.
3. Installing company name, contact information.
4. "Warning, Joint and Void Protection System - Do Not Remove or Tamper.

Adhesive or mechanically attached Identification devices shall be located within 6 in. (150 mm), of the joint and void system edge.

Reason: Installing penetration firestop systems looks as easy as applying red caulk into the annular space of a penetration or gap, breach created for a joint or void. Firestop systems are very complex, detailed listed systems that take understanding of the tolerances so they work when called upon by fire. Firestop systems are not easy to install once the listings are introduced to the installation – which is the only way to install and inspect firestopping.

The proposal adds a requirement to identify the system used to maintain fire-resistance of the assembly where a breach was made to pass penetrating item(s). This is a way for the firestop installation contractor to make others aware of what was installed. Knowing the system or engineering judgement/equivalent fire-resistance-rated assembly installed speeds up the special inspection agency inspector's work by eliminating the need to look up systems during the inspections. It also helps the building owner and manager compare the listings to the jobsite installations during the annual visual inspections required for the life cycle of the building.

This firestop system identification system allows all parties to understand what listing has been used, which then identifies the manufacturer's materials used in the system. The listing identifies the penetrating item(s), annular space size limitations, firestop material manufacturer, and assemblies to protect.

The assemblage of materials designed to keep fire from spreading outside a fire resistance rated assembly needs to be properly installed, inspected and maintained. The identification device makes the firestop special inspection verification process much more cost efficient and effective.

Labeling items at fire-barriers is consistent with other fire-resistance-rated assemblies. In Section 703.5, Marking and Identification, the walls are identified. Fire doors, fire dampers, and fire rated glazing are identified as well. The firestop labelling would be consistent with the requirements for the fire-resistance-rated wall assembly. This identification device provides confidence that the appropriate level of protection is provided, and the fire-resistance-rated design maintained easily.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The identification device cost per penetration firestop system is approximately $0.10 US per penetration.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost increase is limited because the worker is already at the assembly, climbing a ladder or on a lift, with the materials, installing the system. All that needs to happen is adding the identification device, usually a label or tag. However, the device lowers the cost of inspection during construction and annual visual inspection because it saves the inspector time sorting through listings to find the right listing which was used.

FS42-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee concluded that the proposal needs more work to address different issues. For example, the committee had an issue with "device, label or similar treatment". The committee also recommended establishing limits on joints. The committee thought that an "electronic device readable from a distance of 24 in. (610 mm) at a 45-degree angle" is not needed" (Vote: 11-0).

Individual Consideration Agenda

Comment 1:

IBC: 714.2, 714.2.1 (New), 715.2, 715.2.3 (New), ASTM Chapter 35 (New)

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

714.2 Installation. A *listed penetration firestop* system shall be installed in accordance with the manufacturer's installation instructions and the listing criteria.

Add new text as follows:

714.2.1 Identification Device. Penetration firestop systems shall be permanently identified with a device, label, or similar treatment installed in accordance with ASTM WK 70416.

715.2 Installation. Systems or materials protecting *joints* and voids shall be installed in accordance with Sections 715.2.1 ~~and~~ through ~~715.2.2~~ 715.2.3.

Add new text as follows:

715.2.3 Identification Device. Fire-resistant joint systems shall be permanently identified with a device, label or similar treatment installed in accordance with ASTM WK 70416.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70416	New Practice for On-Site Identification of Penetration Firestop Systems and Fire-Resistive Joint Systems and Perimeter Fire Barrier

Reason: The Committee voted for Disapproval based upon some of the proposed language. The Committee also voted for Disapproval of FS40-24 because the standard was not ready. Since FS42 addressed both firestop systems and fire-resistant joint systems, the approach proposed in FS40-24 (using a reference standard) is the language proposed in this Public Comment for both penetration firestop systems and fire-resistant joint systems. We expect that the ASTM standard will be completed by the Public Comment hearing. Assuming that to be the case, a Floor Modification will be submitted to revise the current reference to the correct ASTM Standard number. The ASTM Work Item as submitted, makes inspections easier, clears up inspection issues efficiently and effectively. Knowing the system or Engineering Judgement Number to properly identifying the system. Without the system number, code officials, special inspectors, and building owners don't know which system was used and wind up hunting multiple directories to identify the system description.

Identifying the system installed makes the enforcement process and special inspections easier and more efficient. In addition, the information provided is useful to building owners in the performance of the required visual inspections of penetration firestop systems and fire-resistant joint systems.

The identification devices allow all parties to understanding what listed system was used, which then identifies the manufacturer's

materials used in the system.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The Public Comment, if approved, will increase the cost of construction by about $0.10 per device.

Estimated Immediate Cost Impact Justification (methodology and variables):

The number of devices varies based upon the type of building and the occupancy of the building. It should be noted that the current Working Document allows the grouping of joint systems, resulting in a single device for the group of joints where the same system is used. While the cost of construction could increase, the ability of the code official or special inspectors to enforce the code should decease by making the process for efficient.

Comment (CAH2)# 706

FS47-24

IBC: 714.5, 714.5.1

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

714.5 Horizontal assemblies. Penetrations of a *fire-resistance-rated* floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly not required to be enclosed in a *shaft* by Section 712.1 shall be protected in accordance with Sections 714.5.1 through 714.5.4.

Revise as follows:

714.5.1 Through penetrations. *Through penetrations* of *horizontal assemblies* shall comply with Section 714.5.1.1 or 714.5.1.2. **Exceptions:**

1. Penetrations by steel, ferrous or copper conduits, pipes, tubes or vents or concrete or *masonry* items through a single fire-resistance-rated floor assembly where the *annular space* is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated. Penetrating items with a maximum 6-inch (152 mm) nominal diameter shall not be limited to the penetration of a single fire-resistance-rated floor assembly, provided that the aggregate area of the openings through the assembly does not exceed 144 square inches (92 900 mm^2) in any 100 square feet (9.3 m^2) of floor area.
2. Penetrations in a single concrete floor by steel, ferrous or copper conduits, pipes, tubes or vents with a maximum 6-inch (152 mm) nominal diameter, provided that the concrete, grout or *mortar* is installed the full thickness of the floor or the thickness required to maintain the *fire-resistance rating*. The penetrating items shall not be limited to the penetration of a single concrete floor, provided that the area of the opening through each floor does not exceed 144 square inches (92 900 mm^2).
3. Penetrations by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and installed in accordance with the instructions included in the listing.
4. ~~Penetrations of concrete floors or ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6 where the areas above and below the penetrations are parking areas.~~ Vehicle ramps within or adjacent to parking garages or structures constructed in accordance with Sections 406.5 and 406.6 that are not used for vehicle parking do not require penetrations to comply with Section 714.5.1.1, 714.5.1.2 or 714.5.1.3.

Reason: During the 2021 to 2024 code cycle, Proposal No. FS64-21 introduced a new Exception 4 to Section 714.5.1 which permits unprotected penetrations through floors and ramps of both enclosed and open parking garages where the areas above and below the penetrations are parking areas. We believe this new exception is does not represent good fire protection practices and as such are proposing modifications to the scope of the exception.

The modifications being proposed are intended to limit the application of the exception to vehicle ramps serving parking garage where the ramps are not directly above or below the parking areas. This limitation will minimize the chances of a fire from below involving parked vehicles.

Parking garages often have penetrants (roof drains, electrical conduit, cables, etc.) extending vertically throughout multiple levels of the parking garage. The need to protect penetrations above or below parking areas is critical in preventing ignition of parked vehicles.

The construction of modern vehicles has changed to include more plastics and other combustibles. While this benefits the vehicle weight and fuel economy, and lowers the vehicle price, it increases the fuel load and fire growth we see in parking garages. Modern vehicles present new hazards due to the incorporation of larger quantities of combustible materials (e.g. fuels, plastics, synthetic materials, etc.)

into their designs. Another recent vehicle construction change is the use of plastic fuel tanks. Plastic fuel tanks can result in an earlier release of fuel in a fire. Fire tests at Southwest Research Institute showed fuel leakage as a result of fire exposure occurs after less than five minutes of fire exposure. Fuel spill fires represent a likely means of vehicle-to-vehicle fire spread.1 As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles.

New electric vehicle battery and charging equipment technologies are also leading to much more rapid fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion battery have demonstrated that additional fire safety precautions are needed. It is particularly important to prevent these open and closed parking garage fires from occurring due to the challenges the fire services face in fighting parking garage fires.

There have been a number of recent cases and studies around the world that are demonstrating that fire safety in parking garages should be enhanced, not further reduced as done with Exception 4 of Section 714.5. In recent years, Europe has seen a series of large fires (Liverpool, UK (2017); Cork, Ireland (2018); Stavanger Airport in Sola, Norway (2020)1; Warsaw, Poland (2020)) that brought fires in parking garages into the focus of public discussions. In October, 2023, a major multi-storey parking garage fires occurred at the Luton Airport, London resulting in structural collapse.

A 2020 study on fires of electric vehicles concluded that in just 22 seconds, cell thermal runaway spreads flames throughout the battery compartment. A full-scale fire test was carried out on a battery system of seventeen 3P6S battery modules mounted with control systems in a car chassis. One battery module was overcharged until thermal runaway occurred. Within five seconds, thermal runaway spread to the four adjacent modules. Released gas was immediately ignited, with jet flame and smoke, and temperatures reached over 600 °C. These five modules then smouldered, and further modules ignited after around two minutes. The authors note that water fire suppression would be hindered by the battery pack casings.[1]

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[2]

The photos below show an example of a parking garage penetration. These photos were taken at the Marriott St Louis Grand Hotel multi-story parking garage. An approximate 12 in. by 12 in. opening was located approximately 4 ft from an adjacent parked car. By the 2024 IBC, this unprotected opening is permitted. Is the level of protection we should be permitting?

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average cost of an installed firestop system for concrete floors is $35 - $50 per penetration.

Estimated Immediate Cost Impact Justification (methodology and variables):

The immediate cost impact estimate is based on industry and manufacturer input.This includes materials and labor costs for any type of penetrant through the floor assembly. The cost range includes, sealant based, intumescent, or mechanical devices. The total cost in any given parking garage will depend upon the number of penetrations.

FS47-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee deemed that the proposed text is a necessary clarification. The committee agreed that the proposed text will limit the application of the exception to vehicle ramps serving parking garages where the ramps are not directly above or below the parking areas. This limitation will minimize the chances of a fire from below involving parked vehicles (Vote: 7-4).

FS47-24

Individual Consideration Agenda

Comment 1:

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests Disapproved

Reason: Exception 4 for penetrations in parking areas was put into the code as a common sense proposal to match other allowances in the code. In particular, IBC 712.1.10 allows unenclosed vertical openings in parking garages for automobile ramps, elevators, and mechanical duct systems. Also, IBC 715.3 allows unprotected joints in floors and ramps within parking garages and IBC 715.4 allows unprotected voids at the intersection of curtain walls and floors and ramps in parking garages.

Because of this, it is clear that there is no intent in the code to compartmentalize or separate floors or tiers of a parking garage. Note that vehicles can park immediately adjacent to the unenclosed vertical openings and other items mentioned above - there is no difference in hazard when a vehicle parks adjacent to an unprotected pipe penetration.

Until the larger issue of unenclosed vertical openings is addressed in the code, it does not make sense to require penetrations (or joints or voids at curtain walls) to be protected.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 190

FS49-24

IBC: 714.5.2

Proposed Change as Submitted

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced. **Exceptions:**

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double 2x wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. The ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly is permitted to be interrupted with a single 2x wood top plate of a wall assembly that is sheathed with Type X gypsum wallboard, provided that all penetrating items through the top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

~~8.~~ 9. Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

Reason: The current code language merely requires a “double wood top plate”. As currently written, the top plate could consist of two ½” plywood strips or two 4x8s with no regard to the ability of the material to resist fire. The fact that a clarification statement needed to be added to the code commentary for this item is a clear indication this section needs to be revised. It is important to clarify exactly what the minimum is to achieve the continuity of the membrane rating at the penetration. This code change would allow for a single 2x top plate or a combination of a single 2x top plate with a 1x top plate as a minimum to add clarification to the section. An additional reason for this change is to allow for current construction methods. Standard construction methods in wood construction require a gap to be placed

between the bottom of the floor joists or truss and the top of a non-bearing partition. This allows for deflection of the truss without adverse loading from interference of a non-bearing partition. The standard method for creating this gap is to use a single 2x top plate with a 1x top plate to create a double top plate. Bearing walls and exterior walls are already required to use a double 2x top plate per IBC section 2308.9.3.2 and therefore are not generally affected by this code clarification.

Compliant nailing of the gypsum board can be maintained with a single 2x top plate. In a 1-hour assembly with a single layer of drywall, a single 2x top plate is sufficient to achieve drywall nailing. The standard 2x is 1 ½" thick. If you remove ⅝" for drywall, you are left with ⅞" of plate width for nailing. The required edge distance of a fastener in gypsum board is ⅜" per IBC Section 2508.6.3 allowing an edge distance of ½" on the plate. A standard joint at a stud in a fire rated wall would require ⅜" edge distance for each gypsum sheet leaving only ⅜" edge distance on each side of the stud. This shows that the proposed top plate configuration allows more nailing width than is required in the fire rated assembly.

In a 2 layer assembly, compliant nailing can be achieved with a 2x top plate with a 1x top plate. A 2x, which is 1 ½", and a 1x, which is ¾", will achieve a total top plate thickness of 2 ¼". If one subtracts 1 ¼" for 2 layers of ⅝" gypsum board from 2 ¼", there is 1" remaining. This will allow for ⅜" edge distance on the gypsum sheet as well as ⅝" edge distance on the top plate. This is also in excess of the minimums required for fire rated assemblies.

The 2x with a 1x plate application will also work with resilient channel (RC) and a single layer of gypsum board. The RC is ½" plus the ⅝" gypsum board for a total of 1 ⅛" leaving ¾" of edge distance on the top plate after subtracting the ⅜" drywall edge distance. This would even allow for a full ¾" RC without degrading the fire rating of the assembly.

The order of nailing can also be modified to provide even more edge distance. If the wall sheathing is nailed first, the installer could take full advantage of the entire top plate thickness for edge distance. The ceiling membrane could then be butted tightly to the wall sheathing to achieve the rating. This configuration is demonstrated in U.L. listed assembly system number F-C-2387.

The single wood top plate exceeds the fire resistance of a single layer of ⅝" gypsum board. IBC table 722.6.2(1) assigns a 40 minute rating to ⅝" type x gypsum wall board on wood frame. Table 16.2.1A of the ANSI/AWC National Design Specification for Wood Construction (NDS), as referenced in IBC Section 722.1, assigns a 1-hour char rating to 1 ½" of sawn lumber. Utilizing a single 2x wood top plate as a membrane penetration in a 1 hour application does not reduce the fire resistance rating of the assembly.

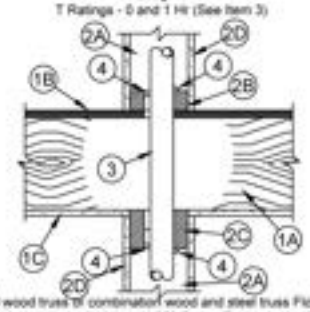
Testing has been performed on this condition and there are currently listed assemblies available. One listing is Specified Technologies Inc. system number F-C-2014 which allows for a single 2x4 or 2x6 top plate. Another listing is 3M system number F-C-2387 which also allows for a single 2x4 or 2x6 top plate. Both of these listings are approved by Underwriters Laboratories to maintain the fire rating of the floor ceiling assembly. It is inappropriate to eliminate options from the code that have been proven by testing to meet the fire resistant requirements.

This proposed change does not limit the design of the building. The design professionals are still free to use a double top plate including 2x and 3x in any situation they deem necessary. This merely allows flexibility for the designer to use different methods while still achieving the required fire ratings.

Classified by
Underwriters Laboratories, Inc.
to ASTM/UL1479 (ASTM E814)

System No. F-C-2014

F Rating - 1 Hr
T Ratings - 0 and 1 Hr (See Item 3)



1. **Floor Assembly** - The 1 hr fire rated wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:
   A. **Joists** - Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
   B. **Flooring System** - Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening in flooring shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   C. **Gypsum Board*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
2. **Chase Wall** - (Optional) - The through penetrants (Item 3) may be routed through a single, double or staggered wood stud/gypsum board chase wall and shall include the following construction features:
   A. **Studs** - Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm), 2 by 8 in. (51 by 203 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
   B. **Sole Plate** - Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates or double nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   C. **Top Plate** - The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates or one or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted together. Diam of opening shall be 3/16 to 5/8 in. (5 to 16 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 3).
   D. **Gypsum Board*** - Min 1/2 in. thick rated or non-rated gypsum board.
3. **Through Penetrant** - One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 0 in. (point contact) to max 1/2 in. (0 to 13 mm). Pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

   Note: When the annular space is min 1/2 in. T Rating is 1 hr, otherwise the T Rating is 0 Hr.
4. **Fill, Void or Cavity Materials* - Caulk** - Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of sole plate or subfloor. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with bottom surface of top plate or gypsum board. At the point contact location or when the annulus between the through penetrant and sole plate or subfloor or top plate or gypsum board is 1/8 in. (3 mm) or less, min 1/2 in. (13 mm) diam bead of fill material applied at the through penetrant/sole plate interface or penetreant/top plate or gypsum board interface.

   SPECIFIED TECHNOLOGIES INC - Type WF300 Caulk

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

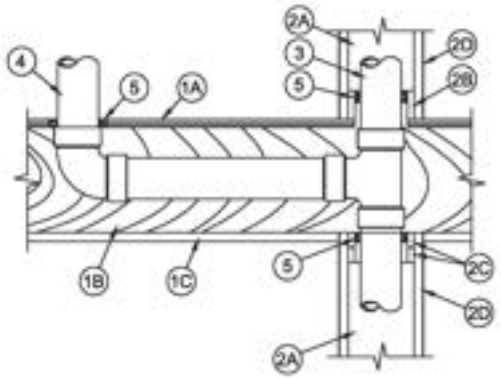
Specified Technologies Inc. 210 Evans Way Somerville, NJ 08876

Created or Revised: June 05, 2015

(800)992-1180 • (908)526-8000 • FAX (908)231-8415 • E-Mail:techserv@stifirestop.com • Website:www.stifirestop.com

System No. F-C-2387

March 20, 2009
F Rating – 1 Hr
T Rating – 0 Hr



1. **Floor Assembly** – The 1 hr fire rated wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:
   A. **Flooring System** – Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening shall be 1/2 in. to 1 in. (13 to 25 mm) larger than the outside diam of nonmetallic pipe (Items 4 and 4).
   B. **Joists** – Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and each floor topped.
   C. **Gypsum Board*** – Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick, attached as described in the individual Floor-Ceiling Design.
2. **Chase Wall** – The through penetrant (Item No. 3) shall be routed through a single, double or staggered wood stude/gypsum board chase wall and shall include the following construction features:
   A. **Studs** – Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber studs.
   B. **Sole Plate** – Nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in sole plate to be 1/2 in. to 1 in. (13 to 25 mm) larger than outside diam of pipe.
   C. **Top Plate** – The single or double top plate shall consist of one or two nom 2 by 4 in. (51 by 102 mm) or 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in top plate to be 1/2 in. to 1 in. (13 to 25 mm) larger than outside diam of pipe.
   D. **Gypsum Board** – Min ½ in. thick rated or nonrated gypsum board.
3. **Through Penetrant** – One nonmetallic pipe to be installed within the firestop system. Pipe to be rigidly supported on both sides of floor-ceiling assembly. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (0 to max 13 mm). The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. **Cellular Core Polyvinyl Chloride (cePVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid-core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   D. **Cellular Core Acrylonitrile Butadiene Styrene (ceABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   E. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
4. **Branch Piping** – (Optional) – One nonmetallic pipe to be connected to through penetrant (Item 3) and installed within opening as follows: The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The following types and sizes of nonmetallic pipes may be used:
   A. **Polyvinyl Chloride (PVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

System No. F-C-2387 *continued*

D. **Cellular Core Polyvinyl Chloride (cePVC) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

D. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** – Nom 3 in. (76 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **FILL, Void or Cavity Materials*** – **Caulk or Sealant** – Min 3/4 in. (19 mm) thickness of caulk applied within annular space around perimeter of through-penetrant (Item 3), flush with top surface of floor or sole plate and flush with bottom surface of lower top plate. Min 3/4 in. (19 mm) thickness of caulk applied within annular space around perimeter of branch piping (Item 4), flush with top surface of floor. Min 1/2 in. (13 mm) diam bead applied at the pipe/floor interface.

3M COMPANY

3M FIRE PROTECTION PRODUCTS – CP 25WB+ caulk, IC 15WB+ caulk or FB-3000 WT sealant

(Note: CP 25WB+ not suitable for use with CPVC pipes.)

*Bearing the UL Classification Mark

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Through Penetrations

Non-Metallic Pipes

2000 Series

Wood Frame Floor/Ceiling

FC

3M Fire Protection Products
www.3m.com/firestop

F-C-2387 • 2 of 2

Product Support Line
1-800-328-1687

Bibliography: Specified Technologies System No. F-C-2014

3M Fire Protection Products System No. F-C-2387

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal is not anticipated to increase or decrease the cost of construction This code change proposal is to clarify the intent of the original code change that brought this exception into the code.

FS49-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee concluded that the proposed text is needed. The committee indicated that this is a necessary

requirement for the ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly to be permitted to be interrupted with a single 2x wood top plate of a wall assembly that is sheathed with Type X gypsum wallboard. The added text requires that all-penetrating items through the top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates (Vote: 6-5).

FS49-24

Individual Consideration Agenda

Comment 1:

IBC: 714.5.2

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced. **Exceptions:**

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double 2x wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

8. The ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly is permitted to be interrupted with a single 2x wood top plate of a wall assembly that is sheathed with Type X gypsum wallboard, provided that all penetrating items through the top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates. The bottom of the wood top plate must extend a minimum of ¾" below the ceiling membrane.

9. Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

Reason: During CAH 1, the opponents were concerned with the ability to achieve fastener edge distances. Upon speaking with the opponents after the hearing, it was determined they wanted clarification that there would be enough wood exposed to achieve proper fastening of the wall membrane. The 3/8" edge distance is in this code and other standards but is not easy to locate and is not associated with this section. Adding the ¾" of exposed bottom plate requirement would insure there is sufficient room to achieve the required fastener edge distance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change proposal is to clarify the intent of the original code change that brought this exception into the code.

Comment (CAH2)# 487

Comment 2:

IBC: 714.5.2

Proponents: Richard Walke, Creative Technology Inc., Self (richwalke61@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced. **Exceptions:**

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.

5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double 2x wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. The ceiling membrane of a maximum 1-hour fire-resistance-rated horizontal assembly is permitted to be interrupted with a minimum of a single 2x wood top plate of a wall assembly that is sheathed with Type X gypsum wallboard, provided the total depth of the top plate(s) exceed the total thickness of the gypsum board and resilient channel on the ceiling by a minimum of 3/4 in., ~~that~~ all penetrating items through the top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 ,and the ceiling membrane is tight to the top plates.
9. Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

Reason: As originally written and as approved at Committee Action Hearing #1, the new Exception 8 is flawed. It specifies the top plate for the minimum 1 hr condition is to consist of a single 2x wood top plate, without regard to the thickness of the gypsum board, or the combination of resilient channel and gypsum board on the ceiling. The vast majority of wall assemblies published in either the UL Product iQ Online Directory or the GA-600 *Fire Resistance and Sound Control Design Manual* require the gypsum board on the wall to be secured to the top plate. The majority of the 1 hr fire-resistance-rated horizontal assemblies published in these same resources require two layers of 1/2 in. thick gypsum board, two layers of 5/8 in. thick gypsum board, or a layer of 1/2 in. deep resilient channel and one layer of 5/8 in. thick gypsum board on the ceiling. In all these conditions, there is insufficient top plate surface remaining to which to fasten the wall panels once the ceiling is installed.

The examples given in the Proponent's Reason statement would suggest compliant nailing can be achieved through the use of additional top plates. While it is true, the language of new Exception 8 does not require those additional top plates. Regardless of the thickness of the ceiling, the requirement of new Exception 8 is a single 2x top plate. As such, the only condition where compliant nailing is achievable with the single 2x top plate is with a ceiling consisting of one layer of 5/8 in. thick gypsum board.

As a reminder, a similar proposal FS67-21 was submitted during the previous code cycle suggesting the use of a single 2x top plate for the 1 hr condition. That proposal was disapproved for the same reason discussed above – an insufficient top plate surface onto which to fasten the wall panels.

In order to resolve this concern, this Comment adds an additional requirement which inter-relates the thickness of the resilient channel and gypsum board on the ceiling with the depth of the top plate member(s). The new requirement specifies the total depth of the top plate(s) exceed the total thickness of the resilient channel and gypsum board by a minimum of 3/4 in. This 3/4 in. then allows the gypsum board on the wall to be secured to the top plate with a minimum 3/8 in. edge clearance between the nail or screw and the edge of the gypsum board as specified by the Gypsum Association.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal is not anticipated to increase or decrease the cost of construction. This code change proposal simply clarifies the intent of the original proposal.

Comment (CAH2)# 473

Comment 3:

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Submitted

Reason: AWC supports the committee's approval of FS49-24 in Committee Action Hearing #1. This situation describes a very common issue in wood frame construction where the stud framing for walls are typically installed prior to the gypsum membrane of floor/ceiling assemblies. There is often debate if this is considered a membrane penetration or not. Item 7 in Section 714.5.2 gives criteria for a double top plate to penetrate a two-hour horizontal assembly, which would lead a code user to think that this situation should be considered a membrane penetration. However, this section did not give an option for a single top plate to penetrate a one-hour horizontal assembly. Because the ANSI/AWC *Fire Design Specification (FDS) for Wood Construction* and Chapter 16 of the ANSI/AWC *National Design Specification (NDS) for Wood Construction* both assign a char depth of 1-1/2" at 1-hour, therefore a single 2x wood top plate would be able to be a substitute for the gypsum membrane in these situations without reducing the fire-resistance rating of that horizontal assembly.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 104

FS50-24

IBC: 714.5.2, 714.5.2.1 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Building Code

Revise as follows:

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2.Membrane penetrations by luminaires shall comply with Section 714.5.2.1. ~~Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.~~ **Exceptions:**

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.
8. ~~Ceiling *membrane penetrations* by *listed* luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.~~

Add new text as follows:

714.5.2.1 Membrane penetrations by luminaires. Penetrations of membranes that are part of a *horizontal assembly* by luminaires (light fixtures) shall comply with one of the following:

1. Luminaires *listed* and *labeled* for use in fire-resistance rated assemblies. The listing shall indicate that the luminaire is suitable for installation in the *horizontal assembly* penetrated with a fire-resistance rating not less than the required rating of the *horizontal assembly* penetrated.
2. Luminaires tested for use in a fire-resistance rated assemblies and are installed in accordance with tested assembly construction specifications.

3. Luminaires protected by an enclosure *listed* and *labeled* for use in fire-resistance designs certified by an *approved agency*.

Reason: This proposal accomplishes the following:

1. Section 714.5.2 currently covers two distinctly different requirements, (a) exceptions to the basic membrane penetration requirements and (b) description of how to cover penetrations by luminaires. This proposal separates the legacy exceptions from the distinctly different luminaire protection requirements, which move to a new 714.5.2.1

2. Section 714.5.2 has been revised to only cover exceptions 1 through 7, and remove reference to luminaires.

3. Section 714.5.2.1 now covers acceptable methods for addressing membrane penetrations by luminaires as follows:

Item 1 covers luminaires that are listed and labeled for use in fire-resistance rated horizontal assemblies. The reference to the listing indicating that the luminaire is suitable for the horizontal assembly penetrated is consistent with how these products are listed. Additional information on this can be found in the guide information for Luminaires, Luminaire Assemblies and Luminaire Enclosures Certified for Fire Resistance (CDHW).

Item 2 addresses the requirements that were previously in exception 8 in a more concise fashion. The reference in exception 8 allowing "luminaires protected with listed materials" was eliminated because we are not aware of materials that have been listed for this application.

Item 3 addresses the requirements for enclosures that have been tested for use in specific fire-resistance rated horizontal designs. The approved agency language is consistent with Section 703.2.2(5).

4. The ambiguous requirement in 713.5.2 that indicate "recessed fixtures shall be installed such that the required fire resistance will not be reduced" has been replaced in 714.5.2.1 with more definitive wording.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Listing for luminaires (light fixtures) that are membrane penetrations regulated by this section of the code currently have a "listing" option (part of the list of exceptions) for compliance with the requirement to maintain fire resistance. As listing as an option is currently included in this code, so there is no additional cost impact. The proposal is a simple editorial revision to provide clarity for the code official with the methods by which to determine code compliance.

FS50-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee approved the proposed language based on the proposal's reason statement (Vote: 11-0).

FS50-24

Individual Consideration Agenda

Comment 1:

IBC: 714.5.2, 714.5.2.1

Proponents: Richard Walke, Creative Technology Inc., Self (richwalke61@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Membrane penetrations by luminaires shall comply with Section 714.5.2.1.

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or *masonry* items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.
2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).
3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing. Protected electrical boxes shall be installed such that the *fire-resistance rating* of the *horizontal assembly* is not reduced.
4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.Electrical boxes shall be installed such that the *fire-resistance rating* of the *horizontal assembly* is not reduced.
5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.
6. Noncombustible items that are cast into concrete building elements and that do not penetrate both top and bottom surfaces of the element.
7. The ceiling membrane of a maximum 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double wood top plate of a wall assembly that is sheathed with *Type X gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

714.5.2.1 Membrane penetrations by luminaires. Penetrations of membranes that are part of a *horizontal assembly* by luminaires (light fixtures) shall comply with one of the following:

1. Luminaires *listed* and *labeled* for use in fire-resistance rated assemblies. The *listing* shall indicate that the luminaire is suitable for installation in the *horizontal assembly* penetrated with a *fire-resistance rating* not less than the required rating of the *horizontal assembly* penetrated.
2. Luminaires tested for use in a fire-resistance rated ~~assemblies~~ assembly and are installed in accordance with tested assembly construction specifications.
3. Luminaires protected by an enclosure *listed* and *labeled* for use in fire-resistance designs certified by an *approved agency*. The *listing* shall indicate the enclosure is suitable for installation with luminaires in the *horizontal assembly* penetrated with a *fire-resistance rating* not less than the required rating of the *horizontal assembly* penetrated.

Reason: This Comment is intended to address two issues associated with FS50-24 which was Approved as Submitted in Committee Action Hearing #1, as follows:

1. In developing FS50-24, UL Solutions deleted the statement "Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire-resistance* will not be reduced." This a key provision which differentiates the performance requirements between recessed membrane penetrations and other membrane penetrations such as pipe or cable penetrations. As such, it is needed to understand the expected level of performance for recessed membrane penetrations. If protecting a typical pipe or cable membrane penetration other than the configuration covered in Exception 1 of Section 714.5.2, the first sentence of the charging language of Section 714.5.2 would apply. These penetrations would be protected so as to comply with Sections 714.5.1.1 or 714.5.1.2. If tested in the approved fire-resistance-rated assembly based on Section 714.5.1.1, the temperature limitation of ASTM E119 or UL 263 would apply. If tested in accordance with ASTM E814 or UL 1479 based on Section 714.5.1.2, the temperature limitation component of a T Rating would be required unless the penetration met one of the exceptions of that Section. If protecting a recessed membrane penetration based on either Section 714.5.1.1 or 7145.1.2, the temperature limitation would always be required as none of the T Rating exceptions of Section 714.5.1.2 would apply. However, if protecting a recessed membrane penetration based on the performance-based Exceptions 3 or 4 of Section 714.5.2, that deleted sentence is needed in order to understand whether the temperature limitations apply or not. As such, this Comment adds the deleted sentence to Exceptions 3 and 4, in a clarified format.
2. This Comment corrects what is believed to be a typo in Section 714.5.2.1(2) of the original proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The reinsertion of the phrase relating to "... recessed fixtures shall be installed such that the required fire-resistance is not reduced" into Exceptions 3 and 4 of Section 714.5.1 has no cost impact as this requirement is currently in the 2024 IBC.

Listing for luminaires (light fixtures) that are membrane penetrations regulated by this section of the code currently have a "listing" option (part of the list of exceptions) for compliance with the requirements to maintain fire resistance. As the listing option is currently included in the code, there is no additional cost impact for luminaires.

Comment (CAH2)# 640

FS53-24

IBC: 715.3

Proposed Change as Submitted

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

715.3 Fire-resistance-rated assembly intersections. *Joints* installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint* system designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed. **Exception:** *Fire-resistant joint systems* shall not be required for *joints* in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the *joint*s protected by a *shaft enclosure* in accordance with Section 713.
3. Floors within *atriums* where the space adjacent to the *atrium* is included in the volume of the *atrium* for smoke control purposes.
4. Floors within *malls*.
5. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
6. *Mezzanine* floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control *joints* not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E119 or UL 263.
10. The intersection of exterior curtain wall assemblies and the roof slab or *roof deck*.
11. Between the bottom of a fire-resistance-rated wall and a floor or floor/ceiling assembly, unless the wall abuts two or more interconnected levels.

Reason: Based on the following, fire-resistive joint systems are not required or necessary where a fire-resistance-rated wall is supported by (sits on) a floor or floor/ceiling assembly.

Although the charging section can be interpreted to apply, the assemblies in question do not meet the definition of a joint in Chapter 2 of the 2024 IBC.

> **JOINT.** The opening in or between adjacent assemblies that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Where a wall is supported by a floor or floor/ceiling assembly, the bottom of a wall is not designed to allow independent movement. Although “building tolerances” is not defined in the IBC, these assemblies also have little if any tolerances due to the methods of construction. As such, the bottom of a fire-resistance-rated wall does not constitute a joint within the intent of Section 715 and additional protection is not required.

Furthermore, the Gypsum Association manual (GA-216) specifies that “Gypsum panel products applied to walls shall be applied with the bottom edge spaced a minimum of 1/4 in. (6 mm) above the floor.” Drywall is attached to studs, which are connected to a base plate and, as such, there will rarely if ever be a gap at the bottom of a wall sufficient to allow migration of fire, smoke or superheated gasses.

In addition, NFPA® 80, the Standard for Fire Doors and Other Opening Protectives specifies that “Clearance under the bottom of a door shall be a maximum of 3⁄4 in. (19 mm).” This is an indication that the bottom of a fire-resistance-rated wall assembly isn’t as critical as the

top, or even the sides.

Based on the preceding, it is clear that joint protection in accordance with Section 715.3 is not required for bottom of wall assemblies and provides little to no additional protection.

THE PHYSICS:

During a fire, the room of origin becomes positively pressurized above the neutral plane and negatively pressurized below the neutral plane. As such, fire, smoke and superheated gasses will rarely if ever migrate from the room of origin into adjacent spaces at the bottom of a wall and protection at the bottom of the wall contradicts the physics of the requirement.

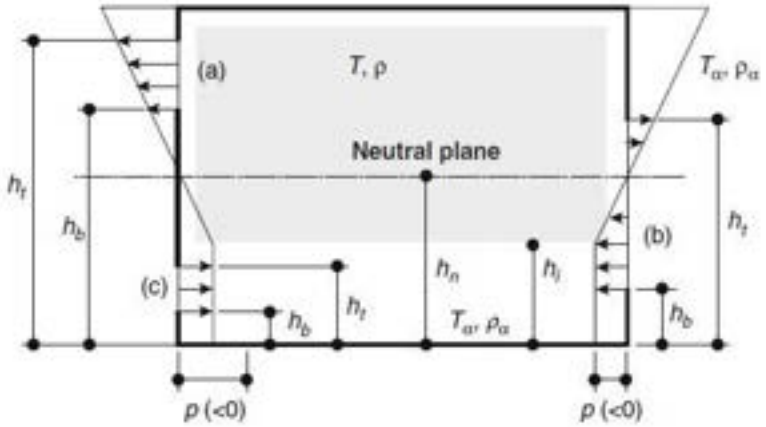

Figure 15.24 from the SFPE Handbook of Fire Protection Engineering – Fifth Edition.

Bibliography: SFPE Handbook of Fire Protection Engineering, Fifth Edition
NFPA® 80, the Standard for Fire Doors and Other Opening Protectives

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Installation of a listed joint system between the bottom of a fire-resistance-rated wall and the floor that supports it ranges from $3 - $4.5 per lineal foot. As such, this clarification of code intent will reduce the cost of construction.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost information was obtained from mechanical vendors and contractors.

FS53-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed text is too broad and needs more work. The committee encouraged the proponent to work on limited use (Vote: 12-0).

FS53-24

Individual Consideration Agenda

Comment 1:

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com) requests As Submitted

Reason: Movement is expected between the top plate and the floor/floor-ceiling assembly above, as well as vertical joints between rated walls. Where a wall is supported by a floor or floor/ceiling assembly, the bottom of a wall is not designed to allow independent movement. I'm sure we will all agree a CMU wall will have little to no associated gap at the bottom and additional protection is unnecessary. Drywall is rigidly attached vertically to studs and horizontally to the top plate and the sill plate/bottom plate. Due to the ridged attachment at the bottom of a wall, there will rarely if ever be a gap at the bottom sufficient to allow migration of fire, smoke or superheated gasses. Although "building tolerances" is not defined in the IBC, these assemblies also have little if any tolerances due to the methods of construction. As such, the bottom of a fire-resistance-rated wall does not constitute a joint within the intent of Section 715 and additional protection is not required.

Since drywall must be rigidly attached to the sill plate/bottom plate (typically a nominal 2 X 4 sleeper), it's unlikely drywall will ever be attached more than one inch above the floor and the space below the drywall will be filled by the sill plate/bottom plate. In addition, a base board will almost always be included to hide the gap between the wallboard and the sill plate/bottom plate. As such, there is essentially no gap at the bottom of a wall constructed of drywall.

Furthermore, the test furnace pressurizes the upper portion of the furnace and draws air into the furnace from the bottom of the wall assembly being tested. As such, almost any material (including nothing) can be expected to pass the test. If the concern is a room fire forcing super-heated gasses and flames under a wall assembly, the test must be modified to demonstrate this condition.

It needs to be clear that the bottom of a wall does not meet the definition of a joint and is not presently required to be protected, as well as present testing is not adequate to address this concern. If the voting members feel this level of protection is prudent, the code and the associated test must be modified appropriately to reflect this condition.

THE PHYSICS (Supplemented):

A shaft or other wall that abuts two or more interconnected levels may experience leakage through the gap at the bottom of a wall sufficient to allow migration of fire, smoke or superheated gasses as demonstrated in the figure included with this comment, which is from the SFPE Handbook of Fire Protection Engineering – Fifth Edition.

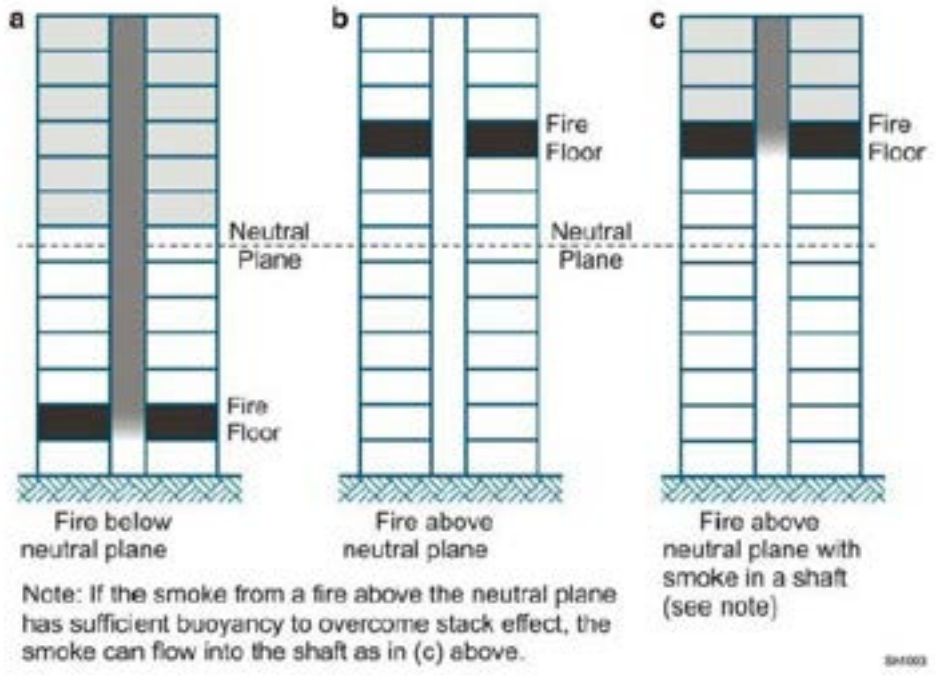

Fig. 50.6 Smoke movement in a high rise building due to normal stack effect

Bibliography: SFPE Handbook of Fire Protection Engineering, Fifth Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

FS55-24

IBC: 715.3, 715.4

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Firestop Contractors International Association (FCIA) (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

715.3 Fire-resistance-rated assembly intersections. *Joints* installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an *approved fire-resistant joint* system designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed. **Exception:** *Fire-resistant joint systems* shall not be required for *joints* in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors where the *joint* is protected by a *shaft enclosure* in accordance with Section 713.
3. Floors within *atriums* where the space adjacent to the *atrium* is included in the volume of the *atrium* for smoke control purposes.
4. Floors within *malls*.
5. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
6. *Mezzanine* floors.
7. Walls that are permitted to have unprotected openings.
8. Roofs where openings are permitted.
9. Control *joints* not exceeding a maximum width of 0.625 inch (15.9 mm) and tested in accordance with ASTM E119 or UL 263.
10. ~~The intersection of exterior curtain wall assemblies and the roof slab or *roof deck*.~~

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor, ~~or~~ floor/ceiling, roof, or roof/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the ~~interior~~ spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.

Exceptions: An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

Reason: Exception 10 is inappropriately located in Section 715. Section 715.3 addresses fire-resistant joint systems, whereas Exception 10 addresses perimeter fire containment systems and should be deleted.

Protecting the breach made at the roof level brings needed firefighter protection while handling firefighting operations from the rooftop.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$35 - $50 per lineal foot of perimeter containment system to be protected.

Estimated Immediate Cost Impact Justification (methodology and variables):

Based on industry and manufacturer input, the average cost of an installed perimeter containment system is $35 - $50/ linear ft.

This includes materials and labor costs for application. The cost estimate is conservative in that if a perimeter containment system is not required, there is still some protection of the intersection that would be required at the roof or roof/ceiling level.

FS55-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification:
715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor, floor/ceiling, roof, or roof/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly.
Exceptions: An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.
3. *Mezzanine* floors.

Committee Reason: The committee agreed that the modification adds back "interior" to the original proposal. The main proposal provides clarity to the code requirements (Vote: 11-1).

FS55-24

Individual Consideration Agenda

Comment 1:

Proponents: David Renn, PE, SE, City and County of Denver, Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org) requests Disapproved

Reason: Section 715.4: This proposal adds a requirement for a perimeter fire containment system between curtain wall assemblies and roof or roof/ceiling assemblies and the only reason given is that it brings needed firefighter protection while handling firefighting operations from the rooftop. This "needed" protection was not backed up with any information that indicates this is an actual issue that needs to be addressed. Since there is no smoke accumulation at the roof, a breach at the perimeter of the roof shouldn't affect firefighting operations. Also, if this is an issue, why didn't this proposal include a change to 715.5 for the void between curtain wall assemblies and nonfire-resistance-rated roof or roof/ceiling assemblies? 715.5 has no requirements for a roof condition.

Furthermore, 712.1.15 currently allows unprotected skylights and other penetrations through the roof and FS37-24 was approved that expands this to all roof openings. With unprotected openings allowed, why does the perimeter void need to be protected? The committee

indicated that this proposal was approved since it provides clarity to the code requirements, but instead it adds a code requirement without justification.

Lastly, this proposal doesn't change the F rating requirements for the added roof or roof/ceiling assemblies, so if approved would require the perimeter fire containment system at the roof or roof/ceiling assembly to have an F rating for the floor or floor/ceiling assembly, which is often a higher rating than required for a roof or roof/ceiling assembly.

Section715.3: This proposal deletes Exception 10 from the requirement for fire-resistant joint systems between fire-resistance-rated assemblies. The reason statement indicates that this was done since Exception 10 is for perimeter fire containment systems (which are in 715.4) so this should be deleted. This reason is incorrect in that 715.3 Exception 10 is for a joint between a fire-resistance-rated roof and a fire-resistance-rated curtain wall, while 715.4 deals with a nonfire-resistance-rated curtain wall. These two sections are for different conditions with different test requirements for fire-resistant joint systems versus perimeter fire containment systems. This exception should remain with the same reasoning as noted above for the perimeter fire containment systems.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 191

FS56-24

IBC: 715.4, 715.5

Proposed Change as Submitted

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., North American Insulation Manufacturers Association (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly. **Exceptions:** An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. ~~Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.~~
3. ~~3~~ 2. *Mezzanine* floors.

715.5 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases.

Exceptions: An *approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. ~~Floors and ramps within parking garages or *structures* constructed in accordance with Sections 406.5 and 406.6.~~
3. ~~3~~ 2. *Mezzanine* floors.

Reason: During the 2024 code cycle, Proposal No. FS75-21 introduced several exceptions to the requirements to protect perimeter voids in open and closed parking garages for both rated and non-rated floor construction. With this change, perimeter openings are not required to be filled with any material, leaving them entirely open though all floors of the parking garage, in a direct vertical path for flames and hot gases to travel. Voids at curtain walls extend long distances throughout an entire parking structure. The openings will often be located directly above or below parked vehicles, which can further complicate fire fighting operations with multiple floors engaged in fire.

Modern vehicles present new hazards due to the incorporation of larger quantities of combustible materials (e.g. fuels, plastics, synthetic materials, etc.) into their designs. Another recent vehicle construction change is the use of plastic fuel tanks. According to the American Chemistry Council, modern vehicles are now composed of about 50 percent plastic by volume, even though plastics account for only 10 percent of the average vehicle's weight. Industry experts believe that as better technologies and additional fuel-efficiency mandates kick in, the percentage of plastics in cars will only increase.[1] As alternative fuel vehicles are popularized, concerns regarding their unique hazards, burn characteristics, and typical burn duration have been raised. Compared to older vehicles, modern vehicles burn differently. At the same time, modern parking garages have optimized space requirements for vehicle parking and storage. It is clear that the design assumption of only one or two fire burning has to be revisited. Cars are larger and have more fuel load than before, and the parking spaces have become smaller. This enhances the probability of fire spread between vehicles.

New electric vehicle battery and charging equipment technologies are also leading to much more rapid fire growth than previously contemplated in parking garage design. Fire accidents caused by the thermal runaway of lithium-ion battery have demonstrated that

additional fire safety precautions are needed. It is particularly important to prevent these open and closed parking garage fires from occurring due to the challenges the fire services face in fighting parking garage fires.

An NFPA Journal article published in 2019 indicated a typical garage fire today is much more likely to involve multiple vehicles than two decades ago, hinting that fires are in fact burning with more severity. In garage fires between 1995 and 1997, only 1 percent of fires involved more than five vehicles. By contrast, between 2010 and 2014, 8 percent of the garage fires involved more than five vehicles.[2] In the United States, Corporate Average Fuel Efficiency standards mandate that passenger vehicle fleets average 54.5 miles per gallon by 2025. To meet those requirements, it is expected that the average car will incorporate nearly 350 kilograms of plastics, up from 200 kilograms in 2014, according to an analysis by IHS Chemical, a chemical industry research group.[1]

Bibliography: [1] NFPA Journal - Protecting Parking Garages, Mar Apr 2019, Ramp Risk, By Jesse Roman.
[2]NFPA Research Foundation - Modern Vehicle Hazards in Parking Structures and Vehicle Carriers by Haavard Boehmer, PE, Michael Klassen, PhD, PE, Stephen Olenick, PE

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Based on the 2024 IBC, the proposal will increase the cost of construction. However, the proposal would bring the cost of construction back to the level of the 2021 and prior IBC editions. Because the 2024 edition is not yet widely adopted, the cost impact is limited at this time.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal would bring the cost of construction back to the level of the 2021 and prior IBC editions. The approximate installed cost is $7-10 per lineal foot.

FS56-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal to be consistent with the action taken on FS54-24 (Vote: 9-3).

FS56-24

Individual Consideration Agenda

Comment 1:

IBC: 715.4, 715.5

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., North American Insulation Manufacturers Association (tcrimi@sympatico.ca) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

715.4 Exterior curtain wall/fire-resistance-rated floor intersections. Voids created at the intersection of exterior curtain wall

assemblies and fire-resistance-rated floor or floor/ceiling assemblies shall be protected with an *approved perimeter fire containment system* to prevent the interior spread of fire. Such systems shall provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor or floor/ceiling assembly. **Exceptions:** An approved perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
2 3. *Mezzanine* floors.

715.5 Exterior curtain wall/nonfire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and nonfire-resistance-rated floor or floor/ceiling assemblies shall be filled with an *approved* material or system to retard the interior spread of fire and hot gases.

Exceptions: An *approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Ramps within parking garages or structures constructed in accordance with Sections 406.5 and 406.6.
2 3. *Mezzanine* floors.

Reason: During CAH #1, the committee mentioned that the code allows for open floors between levels in parking garages, so to have a protected joint adjacent to an opening that is floor-to-floor, does not make sense. However, those floor openings are only in areas without vehicle parking. The area at the perimeter of a parking garage would be open floor-to-floor directly adjacent to vehicle parking areas.

Since the CAH#1 hearings, NFPA Research Foundation has released their Phase II Report on vehicle hazards in parking structures. This Phase II effort aimed to update the 2020 report's analysis and identify fire safety knowledge gaps. The expanded analysis covered various aspects, including parking structure characteristics, parking garage fire statistics, vehicle composition data, applicable codes and standards, and representative fire incidents. Additionally, it reviewed published data on full-scale fire tests with modern vehicles, compiling this information into a database for further analysis.[1] The report concludes, in part:

"Based upon the analysis of the issues at hand and the available literature, three primary knowledge gaps were identified. First, the proper NFPA 13 hazard classification for modern vehicles in a parking garage is unclear. While codes and standards have evolved to require sprinklers in more new parking garages and have also increased the necessary sprinkler water density, the technical justification for selection of the water density is lacking. Code- and standards-making bodies have indicated uncertainty about what the proper sprinkler water density should be to prevent fire spread in parking structures. The review of the literature and incidents has indicated that, in general, if water is applied by sprinklers, the vehicle-to-vehicle fire spread does not occur. But there is a question of whether that is just because a worst-case scenario has not yet been encountered. The technical justification for the proper sprinkler water density in parking structures should be based on testing or data."[1]

In short, it is premature to permit open floor-to-floor perimeter areas that are adjacent to parked vehicles.

Bibliography: [1]NFPA Research Foundation - Classification of Modern Vehicle Hazards in Parking Structures & Systems – Ph II by Stephen Olenick, Michael Klassen, Nasir Hussain Combustion Science & Engineering, Maryland, USA, May 2024

Cost Impact: Increase

Estimated Immediate Cost Impact:

Based on the 2027 IBC, the proposal will increase the cost of construction. The proposal would bring the cost of construction back to the level of the 2024 and prior IBC editions.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal would bring the cost of construction back to the level of the 2021 and prior IBC editions. The approximate installed cost is $7-10 per lineal foot.

Comment (CAH2)# 386

FS61-24

IBC: TABLE 716.1(2)

Proposed Change as Submitted

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance[i]
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]			—				
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		$1\frac{1}{2}$	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		$\frac{1}{3}$[a]	Maximum size tested	D-20	$\frac{3}{4}$[a]		D-H-OH-45	
	0.5		$\frac{1}{3}$[a]	Maximum size tested	D-20	$\frac{1}{3}$		D-H-OH-20	
Other fire partitions	1		$\frac{3}{4}$[i]	Maximum size tested	D-H-45	$\frac{3}{4}$		D-H-45	
	0.5		$\frac{1}{3}$	Maximum size tested	D-H-20	$\frac{1}{3}$		D-H-20	
Exterior walls	3		$1\frac{1}{2}$	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	Maximum size tested	D-H 90 or D-H-W-90	$1\frac{1}{2}$[h]	2	D-H-OH-90[h]	W-120
						Fire protection			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Smoke barriers	1	$^3/_4$	Maximum size tested	D-H-45	$^3/_4$[h]		D-H-45[h]	
	1	$^1/_3$	Maximum size tested	D-20	Fire protection $^3/_4$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of $1^1/_2$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. See Section 716.2.5.4 for requirements for fire-resistance-rated glazing installed in sidelight/transom panels.

Reason: This proposal is intended to clarify the type of glazing and frame required in sidelights and transoms in applications where fire-protection-rated glazing is not permitted. Where this issue gets confusing is that for Door Vision Panels which exceed the allowable size for fire-protection-rated glazing, fire-resistance-rated glazing may be used within the typical glass light kit. These glass light kits are considered to be fire-protection-rated in that like the door in which they are installed, they will not meet the heat transmission requirements of ASTM E119 and UL 263. However, when fire-protection-rated glazing is not permitted in sidelights and transoms, a fire-resistance-rated glazing and frame assembly having a fire-resistance rating based on testing the combination of the glazing and frame assembly in accordance with ASTM E119 or UL 263 must be used. The new Footnote j clarifies this point by referencing the code user to Section 716.2.5.4 where the required glazing and frame are clarified. There are multiple fire resistance designs published by the various Nationally Recognized Testing Laboratories which can be used to show compliance with this requirement.

It is believed this new footnote will reduce the confusion on the type of glazing and frame required and help ensure the proper glazing and frame is used in this application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarity the existing requirements.

FS61-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee agreed with the proposed clarification to the type of glazing and frame required in sidelights and transoms in applications where fire protection-rated glazing is not permitted (Vote: 11-1).

FS61-24

Individual Consideration Agenda

Comment 1:

Proponents: Thom Zaremba, Roetzel & Andress, National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, Primary Fire Rated Glazing Manufacturers (nresetar@ralaw.com) requests Disapproved

Reason: Although FS61-24 may be well intentioned, it should be disapproved for three reasons. First, it will actually make Table 716.1(2) more, not less, confusing. Second, it is, simply, not necessary. Third, no evidence of any actual confusion has been presented to warrant adding yet another foot note to Table 716.2(1).

The first sentence of its reason statement says: "This proposal is intended to clarify the type of glazing and frame required in sidelights and transoms ...." However, the change approved at the Public Comment Hearing does not clarify Table 716.1(2). It will actually make Table 716.1(2) more confusing for those using it.

The confusion that FS61-24 creates is found in the lower half of the main vertical column where the Proponent places its proposed foot note. There, the main column goes back and forth several times from having two sub-columns to having only one sub-column. Where "Fire barriers having a required fire-resistance rating of 1 hour" changes to "Other fire barriers," the main column merges into a single column that only contains "fire protection" markings. Then, where "Other fire barriers" changes to "Exterior walls" the main column again breaks into two sub-columns, with both "fire protection" and "fire-resistance" markings. Finally, where "Exterior walls" changes to "Smoke barriers," the main column merges again into a single column containing only "fire protection" markings.

Putting the new foot note in the sub-column entitled "Fire Resistance," will leave those using Table 716.1(2) to ask whether the new foot note does or does not apply to those areas of the main vertical column that only has one sub-column? The foot note would only properly apply to fire-resistance rated assemblies, but where the main column has only one sub-column, the Table only references fire protection rated markings! Nothing in FS61-24 answers whether the text of FS61-24's foot note is intended to apply to those single sub-column areas or not.

In addition to adding confusion, FS61-24 is not even necessary. Table 716.1(2) was never intended to be a substitute for the mandatory requirements spelled out in the text of Chapter 7. Instead, it was added to Chapter 7 to summarize Chapter 7's requirements. Does every entry in Table 716.1(2) need a pointer, like the one proposed in FS61-24? No, of course not. Moving back and forth from one foot note to another to and from one cell after another and back again only makes the Table harder to read and harder to use.

Another pointer should only be added to this Table if it has been established that actual confusion exists requiring it. Here, no evidence of any actual confusion has been presented to warrant adding yet another foot note to Table 716.1(2).

Because it adds confusion, is unnecessary, and is without any substantiating evidence of actual confusion, we urge the Committee to

disapprove FS61-24.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 506

FS62-24

IBC: TABLE 716.1(2), 716.2.5.4

Proposed Change as Submitted

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]			—				
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		$1\frac{1}{2}$	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		$\frac{3}{4}$[h]	Maximum size tested	D-H-45	$\frac{3}{4}$[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		$\frac{1}{3}$[a]	Maximum size tested	D-20	$\frac{3}{4}$[a]		D-H-OH-45	
	0.5		$\frac{1}{3}$[a]	Maximum size tested	D-20	$\frac{1}{3}$		D-H-OH-20	
Other fire partitions	1		$\frac{3}{4}$[i]	Maximum size tested	D-H-45	$\frac{3}{4}$		D-H-45	
	0.5		$\frac{1}{3}$	Maximum size tested	D-H-20	$\frac{1}{3}$		D-H-20	
Exterior walls	3		$1\frac{1}{2}$	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	2	$1^1/_2$	~~Maximum size tested~~ 100 sq. in.[a] ~~or~~ > 100 sq. in = D-H-W-90	≤ 100 sq. in. = D-H 90	~~1 1/2 h~~ Not Permitted	2	~~D-H-OH-90[h]~~ Not Permitted	W-120
Smoke barriers	1	$^3/_4$	Maximum size tested	D-H-45	Fire protection $^3/_4$[h]		D-H-45[h]	
	1	$^1/_3$	Maximum size tested	D-20	Fire protection $^3/_4$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of $1^1/_2$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

716.2.5.4 Fire door frames with transom lights and sidelights. Fire-protection-rated glazing shall be permitted in door frames with transom lights, sidelights or both, where a $^3/_4$-hour *fire protection rating* or less is required ~~and in 2-hour fire-resistance-rated *exterior walls*~~ in accordance with Table 716.1(2). *Fire door* frames with transom lights, sidelights or both, installed with fire-resistance-rated glazing tested as an assembly in accordance with ASTM E119 or UL 263 shall be permitted where a *fire protection rating* exceeding $^3/_4$ hour is required in accordance with Table 716.1(2).

Reason: This proposal is intended to increase the required level of fire performance for glazing within fire door assemblies and within sidelights and transom panels in 2 hr exterior walls applications. In doing so, it also brings consistency within Table 716.1(2) for all applications requiring a fire door / fire shutter rating in excess of 3/4 hr.

The revisions to Table 716.1(2) and Section 716.2.5.4 are specifically intended to limit the allowable area of fire-protection-rated glazing in 1-1/2 hr fire-protection-rated fire door assemblies in exterior walls to a maximum of 100 sq. in. If more than 100 sq. in. of glazing is

needed, then fire-resistance-rated glazing is required. In addition, this proposal is intended to require sidelights and transoms adjacent to these doors to be glazed with fire-resistance-rated glazing in recognition of the relatively large sections of glazing typical installed in the sidelights and transoms.

Both fire-protection-rated glazing and fire-resistance-rated glazing are intended to stop the spread of flame and smoke. However, fire-resistance-rated glazing also complies with an unexposed surface temperature limitation on the glazing. The test standards utilized to determine the fire-resistance rating, ASTM E119 / UL 263, limit the temperature rise on the unexposed side to 250°F average / 325°F individual point for the entire duration of the fire exposure. The standards utilized to determine the fire-protection rating on the fire door assembly, NFPA 252 / UL 10B / UL 10C, and on the sidelights and transom panels, NFPA 257 / UL 9, do not have a temperature limitation. As a result, the glazing gets hot!

Many studies have been conducted over years to quantity the level of radiant heat from fire-protection-rated glazing. The radiant heat from the glazing is significant enough to cause a fire on the other side of the fire-resistance-rated barrier. Three individual Test Reports /Data Packages analyzing the heat transfer and radiant heat from the glazing are described below:

1. The June 9, 2006 **Fire Tests of Building Construction and Materials w/ Radiation Reaction of Mannequins** evaluated three variations of ceramic fire-protection-rated glazing, 44 in wide by 77 in. tall in SAFTI*FIRST*'s EZ frame, installed in a masonry wall assembly. Fully clothed mannequins were placed 20 in. for each of the glazing panels. The mannequin's ignited at 9:06, 12:15 and 16:10 for the three glazing variations. This report is available at https://www.dropbox.com/scl/fi/2vuykq3n8ztk7zkr3sk84/Radiant-Heat-Test-Report.pdf?rlkey=lk6ehccg0kgqjdtvmu0ndrrjs&dl=0

2. The March 20, 2006 **O'Keeffe's Inc. – Glass Profile** data package is a more complete data package of the thermal imaging camera data for fire test described in the June 9, 2006 Report. The data shows the temperature on each of the three glazing materials exceeded 1000°F in approximately 10 min. This report is available at https://www.dropbox.com/scl/fi/8u23sxu4f35g5jjrt08vg/Infrared-Inspection-V2.pdf?rlkey=xa847sn3hnnhk7rji24x9siqc&dl=0

3. The May 13, 2016 **Report of Testing Ceramic Glass with Reference SAFTI FIRST EZ Frame for compliance with the applicable requirements of the following criteria: Modified UL 9, Standard for Safety, Fire Tests of Window Assemblies, 2009** evaluated one 43 in. wide by 77 in. tall ceramic glazing panel in SAFTI*FIRST*'s EZ frame, installed in a gypsum board wall assembly. The thermal imaging camera data for this fire test shows an average temperature of approximately 970°F at 10 min. In addition, this report also shows a radiant heat flux of approximately 24 KW/m^2 at a distance of 1.0 meter from the glazing, at 45 min into the fire exposure test. A generally accepted level of heat flux sufficient to ignite wood under a piloted and nonpiloted scenario is 12.5 and 29 kW / m^2. This report is available at https://www.dropbox.com/scl/fi/knhapos5u2w68bwx4s8ha/Final-Test-Report.pdf?rlkey=0zhuwqmn8e7iazg5c73b8oqea&dl=0

Looking at the current Table 716.1(2), all applications requiring a Minimum Fire Door and Fire Shutter Assembly Rating greater than 3/4 hr other than 1-1/2 hr fire-door assemblies in 2 hr exterior walls, limits the area of fire-protection-rated glazing in the door to 100 sq. in. In addition, all applications other than 1-1/2 hr fire door assemblies in exterior walls do not permit the use of fire-protection-rated glazing in side-lights or transoms regardless of size. As such, the change proposed herein brings consistency to the various applications covered in Table 716.1(2).

In addition to the changes required in Table 716.1(2), Section 716.2.5.4 is also being changed to be consistent with the changes in Table 716.1(2).

On the surface this proposal appears to have major consequences. However, the applications where this proposed change would have an impact is very limited. Based on Tables 601 and 705.5, the applications where this change would have an impact are as follows:

1. Exterior Bearing Walls in Types IB, IIIA, IIIB, IVB, IVC and IVHT types of construction

2. Exterior Nonbearing Walls with Fire Separation Distances < 5 ft in all types of construction in F-1, M and S-1 occupancies

3. Exterior Nonbearing Walls with Fire Separation Distances of 5 ≤ X < 10 ft in all IA and IVA types of construction in F-1, M and S-1 occupancies

4. Exterior Nonbearing Walls with Fire Separation Distances of 5 ≤ X < 10 ft in all types of construction other than IA and IVA in H occupancies

5. Exterior Nonbearing Walls with Fire Separation Distances of 10 ≤ X < 30 ft in IA, IB, IVA and IVB types of construction in H occupancies

The applications where this proposal truly has an impact is further reduced through the application of Table 705.8. This table permits a combination of protected and unprotected openings based on fire separation distance and the use of sprinklers.

Bibliography: Radiant Heat Flux https://guides.firedynamicstraining.ca/g/structural-firefighting-fundamentals-of-fire-and-combustion/118132

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average additional installed cost of fire-resistance-rated glazing as compared to fire-protection-rated glazing is approximately $60 to $85 / sq. ft, depending on the rating. However as stated in the Reason Statement, the applications where this proposed change would have an impact is very limited.

Estimated Immediate Cost Impact Justification (methodology and variables):

This includes average materials and labor costs for the above items. In the end, the exact increase in cost is based on the fire separation distance, the type of construction, the occupancy and the specific building design in question.

FS62-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language is not necessary. The committee indicated that the proponent did not provide data to support the need for this code change (Vote: 9-3).

FS62-24

Individual Consideration Agenda

Comment 1:

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com) requests As Submitted

Reason: This comment is asking that this proposal be approved as submitted (AS) for the reasons conveyed in the original Reason statement. The reports linked to that Reason statement provided data on the heat flux emitted from various types of fire-protection-rated glazing when exposed to an ASTM E119 / UL 263 time-temperature curve. These heat flux levels have the potential to ignite adjacent combustible construction as discussed below.

During the testimony at Committee Action Hearing #1, both supporters and opponents were asked by committee members if they were aware of actual fires where fire-protection-rated glazing stayed in place yet there was ignition of an adjacent structure. The answer from both sides was no. I have subsequently spent hours searching the web for fire incident reports documenting the performance of fire-protection-rated or fire-resistance-rated glazing in fire doors and side-light / transom panels in exterior walls. I was unable to locate any data which drilled down to that level of detail. As such, I don't believe we will be able to answer that question in a definitive manner either way.

Testimony at Committee Action Hearing #1 supported the theoretical position that radiant heat from fire-protection-rated glazing has the potential for igniting adjacent buildings. The potential of a fire to ignite adjacent buildings is dependent on a number of factors, including the construction of the adjacent building, the fire separation distance, the intensity of the fire, and the type of glazing used in fire doors and side-light / transom panels. These factors will dictate the heat flux seen by the adjacent construction. The heat flux level required for autoignition of wood is generally agreed to be approximately 12.5 kW/m2 for an exposure time of approximately 10 to 20 minutes.1 Based on the Reports referenced in the original Reason statement, the radiant heat through fire-protection-rated glazing certainly has the potential to ignite the adjacent construction.

As stated in the original Reason statement, this proposal, if approved, will impact only a very limited number of buildings. The original Reason statement detailed the impacted Types of Construction and Occupancies based on the fire separation distance. Beyond those limitations, Table 705.9 further limits the need for protected openings to fire separation distances of less than 3 ft for sprinklered and nonsprinklered applications, and 3 ft to less than 5 ft for nonsprinklered applications. Exterior walls with larger fire separation distances are permitted some percentage of unprotected openings.

Bibliography: [1] Journal of Fire Protection Engineering, August, 2002 - Ignition of Wood, A Review of the State of the Art, by Vytenis Babrauskas, Ph.D.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 438

FS63-24

IBC: TABLE 716.1(2), TABLE 716.1(3)

Proposed Change as Submitted

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 716.1(2) ~~OPENING~~ FIRE DOOR ASSEMBLY ~~PROTECTION ASSEMBLIES,~~ RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[~~a~~ b]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL [~~b~~, c, d]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note ~~a~~ b	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[~~d~~ e]	See Note ~~a~~ b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours) [~~e~~ f]	Each wall of the double-wall assembly (hours) [f g]			—				
	4	3	3	See Note ~~a~~ b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps~~.~~		2	$1\frac{1}{2}$	100 sq. in.[~~b~~ c]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[~~f~~ h]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[~~d~~ e]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$ [~~h~~ i]		D-H-45[~~h~~ i]	
Fire partitions: Corridor walls	1		$\frac{1}{3}$ [~~a~~ b]	Maximum size tested	D-20	$\frac{3}{4}$ [~~a~~ b]		D-H-OH-45	
	0.5		$\frac{1}{3}$ [~~a~~ b]	Maximum size tested	D-20	$\frac{1}{3}$		D-H-OH-20	
Other fire partitions	1		$\frac{3}{4}$ [~~i~~ j]	Maximum size tested	D-H-45	$\frac{3}{4}$		D-H-45	
	0.5		$\frac{1}{3}$	Maximum size tested	D-H-20	$\frac{1}{3}$		D-H-20	
Exterior walls	3		$1\frac{1}{2}$	100 sq. in.[~~e~~ b]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	Maximum size tested	D-H 90 or D-H-W-90	$1\frac{1}{2}$ [~~h~~ i]	2	D-H-OH-90 [~~h~~ i]	W-120
						Fire protection			

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
	1	3/4	Maximum size tested	D-H-45	3/4 hi		D-H-45 hi	
Smoke barriers					Fire protection			
	1	1/3	Maximum size tested	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Where required, glazing shall also comply with the safety glazing requirements and identification specified in Section 716.1.2.1.

~~a~~ b. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

~~b~~ c. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

~~c~~ d. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

~~d~~ e. Two doors, each with a fire protection rating of $1\frac{1}{2}$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

~~e~~ f. As required in Section 706.4.

~~f~~ g. As allowed in Section 4.6 of NFPA 221.

~~g~~ h. See Section 716.2.5.1.2.

~~h~~ i. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

~~i~~ j. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

TABLE 716.1(3) FIRE WINDOW ASSEMBLY ~~FIRE PROTECTION~~ RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP [ab]	W-XXX [bc]
Fire barriers	>1	NP [ab]	W-XXX [bc]
	1	NP [ab]	W-XXX [bc]
Atrium separations (Section 707.3.6), Incidental use areas (Section 707.3.7), [ed] Mixed occupancy separations (Section 707.3.9)	1	3/4	OH-45 or W-60
Fire partitions	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30
Smoke barriers	1	3/4	OH-45 or W-60
Exterior walls	>1	$1\frac{1}{2}$	OH-90 or W-XXX [bc]
	1	3/4	OH-45 or W-60
	0.5	1/3	OH-20 or W-30

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Party wall	All	NP	Not Applicable

NP = Not Permitted.

a. Where required, glazing shall also comply with the safety glazing requirements and identification specified in Section 716.1.2.1.

~~a~~ b. Not permitted except fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3.

~~b~~ c. XXX = The fire rating duration period in minutes, which shall be equal to the fire-resistance rating required for the wall assembly.

~~c~~ d. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 orUL 263, as specified in Section 716.1.2.3, shall be permitted.

Reason: This proposal is intended to ensure code users are aware that glazing in or around door assemblies and in fire window assemblies is in most cases required to meet the safety glazing requirements of Chapter 24. The new footnote a to Tables 716.1(2) and 716.1(3) points the code users to Section 716.1.2.1, which in turn points the code readers to Chapter 24. Within Chapter 24, Section 2406 covers the requirements for safety glazing including the marking requirements.

The identification of all subsequent footnotes has been shifted one character as a result of the new Footnote a.

In addition to the new footnote, the titles of Tables 716.1(2) and 716.1(3) have been changed to more accurately reflect the information conveyed in the tables.

It is believed this new footnote a will help ensure the proper glazing is used in applications requiring safety glazing.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarify the existing requirements.

FS63-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language is not necessary and already addressed in the code (Vote: 9-3).

FS63-24

Individual Consideration Agenda

Comment 1:

IBC: TABLE 716.1(2), TABLE 716.1(3)

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

TABLE 716.1(2) FIRE DOOR ASSEMBLY RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[b]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[c, d]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note b	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[e]	See Note b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[f]	Each wall of the double-wall assembly (hours)[g]			—				
	4	3	3	See Note b	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps	2		$1\frac{1}{2}$	100 sq. in.[c]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[h]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[e]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$[i]		D-H-45[i]	
Fire partitions: Corridor walls	1		$\frac{1}{3}$[b]	Maximum size tested	D-20	$\frac{3}{4}$[b]		D-H-OH-45	
	0.5		$\frac{1}{3}$[b]	Maximum size tested	D-20	$\frac{1}{3}$		D-H-OH-20	
Other fire partitions	1		$\frac{3}{4}$[j]	Maximum size tested	D-H-45	$\frac{3}{4}$		D-H-45	
	0.5		$\frac{1}{3}$	Maximum size tested	D-H-20	$\frac{1}{3}$		D-H-20	
Exterior walls	3		$1\frac{1}{2}$	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	Maximum size tested	D-H 90 or D-H-W-90	$1\frac{1}{2}$[i]	2	D-H-OH-90[i]	W-120
						Fire protection			
	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$[i]		D-H-45[i]	
Smoke barriers						**Fire protection**			
	1		$\frac{1}{3}$	Maximum size tested	D-20	$\frac{3}{4}$		D-H-OH-45	

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance

For SI: 1 square inch = 645.2 mm.

a. ~~Where required, glazing~~ Glazing shall also comply with the safety glazing requirements and identification specified in ~~Section 716.1.2.1~~ Chapter 24 where applicable.

b. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

c. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

d. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

e. Two doors, each with a fire protection rating of $1\,^1/_2$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

f. As required in Section 706.4.

g. As allowed in Section 4.6 of NFPA 221.

h. See Section 716.2.5.1.2.

i. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

j. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

TABLE 716.1(3) FIRE WINDOW ASSEMBLY RATINGS AND FIRE-RATED GLAZING MARKINGS [a]

TYPE OF WALL ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)	FIRE-RATED GLAZING MARKING
Interior walls			
Fire walls	All	NP[b]	W-XXX[c]
Fire barriers	>1	NP[b]	W-XXX[c]
	1	NP[b]	W-XXX[c]
Atrium separations (Section 707.3.6), Incidental use areas (Section 707.3.7),[d] Mixed occupancy separations (Section 707.3.9)	1	$^3/_4$	OH-45 or W-60
Fire partitions	1	$^3/_4$	OH-45 or W-60
	0.5	$^1/_3$	OH-20 or W-30
Smoke barriers	1	$^3/_4$	OH-45 or W-60
Exterior walls	>1	$1\,^1/_2$	OH-90 or W-XXX[c]
	1	$^3/_4$	OH-45 or W-60
	0.5	$^1/_3$	OH-20 or W-30
Party wall	All	NP	Not Applicable

NP = Not Permitted.

a. ~~Where required, glazing~~Glazing shall also comply with the safety glazing requirements and identification specified in ~~Section 716.1.2.1~~ Chapter 24 where applicable.

b. Not permitted except fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3.

c. XXX = The fire rating duration period in minutes, which shall be equal to the fire-resistance rating required for the wall assembly.

d. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 orUL 263, as specified in Section 716.1.2.3, shall be permitted.

Reason: This proposal is intended to ensure code users are aware that glazing in or around fire door assemblies and in fire window assemblies is in most cases required to meet the safety glazing requirements of Chapter 24 of the IBC. The new footnote a to Tables 716.1(2) and 716.1(3) points the code users to the requirements for safety glazing including the marking requirements.

The identification of all subsequent footnotes has been shifted one character as a result of the new Footnote a.

In addition to the new footnote, the titles of Tables 716.1(2) and 716.1(3) have been changed to more accurately reflect the information conveyed in the tables.

Since the Committee Action Hearing, one change has been made to this proposed footnote. The footnote now points directly to Chapter 24 where the specific requirements are found, instead of Section 716.2.1.

During Committee Action Hearing #1, opposition stated the safety glazing requirements are already contained in Section 716.1.2.1. While that is true, the dynamics relating to the use of Tables 716.1(2) and 716.1(3) have changed as a result of the expansion of these tables which occurred with the 2012 IBC. Realistically, these tables have become primary reference in Section 716 for enforcing the code. One of the few required elements missing in the Tables is a reference to the safety glazing requirements. As such, this proposal adds a pointer to the safety glazing requirements through a new Footnote a. Opposition also stated everyone already knows the IBC contains safety glazing requirements. As such, this footnote is not needed. Unfortunately, “everyone” does not already know this. There are new design professionals, contractors and code officials entering the construction field on a regular basis. They may not be aware of these requirements. If we can prevent one serious injury by adding one short footnote to each of these tables, it is worth the effort.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes simply clarify the existing requirements.

Comment (CAH2)# 453

FS65-24

IBC: 716.2.6.1

Proposed Change as Submitted

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Building Code

Revise as follows:

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section. **Exceptions:**

1. *Fire doors* located in common walls separating *dwelling units* or *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. Fire doors located in corridors and serving sleeping rooms in Group I-1, Condition 2 shall be permitted without automatic- or self-closing devices.
3 ~~2~~. The elevator car doors and the associated elevator hoistway doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
4 ~~3~~. Fire doors required solely for compliance with ICC 500 shall not be required to be *self-closing* or automatic-closing.

Reason: Nursing homes (Group I-2, Condition 2) are not required to have self-closing or automatic-closing corridor doors. This is due to the facilities having smoke compartments to subdivide care recipient sleeping areas, the building being fully sprinklered, and staff trained in fire and safety evacuation plans. Assisted living (Group I-1, Condition 2) are also required to have smoke compartments, the building to be fully sprinklered and the staff trained in fire and safety evacuation plans. In Assisted living (Group I-1, Condition 2), residents, while slower, are required to be capable of self preservation. In these facilities, it is beneficial to allow for door to be open to improved supervision and to increase social interaction - both of which shown to improve the environment and comfort of care recipients.

Care recipients in Assisted Living (I-1, Condition 2) facilities quite often use mobility devices and/or have balance and gait issues that take them longer to move through door openings. Additionally, I-1, Condition 2 Assisted Living care recipients are often frail and quite often struggle to have enough strength to open doors with automatic closers. It is a constant challenge to adjust closers to be able to reduce the amount of force needed to open the door, plus keep it open long enough for occupants to move through the opening, and then create enough force for the door to close and latch properly. Often, the last bit of the door swing closes fast to provide the proper latching, but then the door often hits the care recipient causing injury or even knocking them over.

The intent of this proposal is to allow for Group I-1, Condition 2 facilities to not require self-closing or automatic-closing corridor doors. The Healthcare committee feels that this will improve patient safety on a daily basis. There is a good balance of passive and active fire protection that will still be in place, and the fire and safety plans can include closing doors.

This is not intended to allow for the removal of self-closers or automatic-closers on the fire barriers around stairways or on the cross-corridor doors for smoke compartment.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average cost of door closers, not including the cost of labor for installation, ranges from $150 to $600 dollars. The total decrease would depend on the number of sleeping room doors in the facility.

Estimated Immediate Cost Impact Justification (methodology and variables):

If a designer chooses to utilize this exception, closers would not be required on corridor doors.

FS65-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language is confusing on the location of the fire door. The committee mentioned that the assumption is that the building is sprinkled. The committee disagreed that smoke compartments are the same in Nursing homes vs Assisted living (Vote: 10-2).

FS65-24

Individual Consideration Agenda

Comment 1:

IBC: 716.2.6.1

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section. **Exceptions:**

1. *Fire doors* located in common walls separating *dwelling units* or *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.
2. In Group I-1, Condition 2, fire ~~Fire~~ doors located in corridors and serving sleeping ~~rooms~~ units that do not include a cooktop or range ~~in Group I-1, Condition 2~~ shall be permitted without automatic- or self-closing devices.
3. The elevator car doors and the associated elevator hoistway doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.
4. Fire doors required solely for compliance with ICC 500 shall not be required to be *self-closing* or automatic-closing.

Reason: First, it is important to note that Group I-1, Condition 2 facilities require the residents to be capable of self-preservation with limited limited verbal or physical assistance (Section 308.2.2). This is defined as following: [BG]LIMITED VERBAL OR PHYSICAL ASSISTANCE. Describes persons who, because of age, physical limitations, cognitive limitations, treatment or chemical dependency, may not independently recognize, respond or evacuate without limited verbal or physical assistance during an emergency situation. Limited verbal assistance includes prompting, giving and repeating instructions. Limited physical assistance includes assistance with transfers to walking aids or mobility devices and assistance with egress. The committee expressed concern about the staffing to resident

ratio for assisted living. The following active and passive fire protection requirements are applicable for Group I-1, Condition 2: 1.
1 hour rated corridors (Table 1020.2)
2. Separation between units (Section 420.2, 420.3, 708, 711)
3. Smoke compartments (Section 420.6, 709)
4. NFPA 13 Sprinkler system (Section 420.4, 903.2.6)
5. Fire alarms and smoke detection systems; immediate notification of residents and some units with visible alarms (Section 420.5, 907.2.6, 907.2.6.1, 907.5.2.3.2)
6. Smoke alarms in the units (Section 420.5, 907.2.6.1.1, 907.2.11)
7. Common cooking areas limited the same as Group I-2, Condition 2 (Section 420.7)
So a Group I-1, Condition 2 will have rated corridors and rated doors on the sleeping unit doors, in addition to the smoke compartments. Nursing homes have smoke compartments, but not rated corridors, rated unit doors or separation of units. In addition, Group I-1, Condition 2 have smoke alarms in the units, which nursing homes do not require. This exception to remove closers is limited to the rated entrance doors to sleeping units, not other rooms and spaces in the facility. A person using a walker or crutches does not have an extra hand to hold open a door with a closer. Person's using canes or walkers tend to move slower through a door. Closers are difficult for these individuals to deal with. Many people have been injured attempting to move into and out of their sleeping units. The extra passive fire protections systems in place in an assisted living facility should provided a reasonable level of safety to balance the removal of the closers in these limited situations. The definition for sleeping unit states that sleeping units can include kitchen facilities. **[A] SLEEPING UNIT.** A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units. In assisted living facilities, almost all the cooking is in a central location. Units might have microwaves, sinks and refrigerators, but not cooktops or ovens. Most fires in residences (apartments or homes) start in the kitchen. Therefore, we are also suggesting that sleeping units with full kitchens cannot use this exception. The doors and corridors will still be rated, so it doors are closed, this passive protection is still in place. It is our opinion that the additional passive and active fire protections required will balance with the need to for resident safety as they move in and out of their unit. Below are pictures illustrating people with crutches and walkers moving through doors
.

We were able to find some statistics for falls related to persons over 65 and Assisted Living Facilities.

Most Impactful Statistics on Falls and Fires in Assisted Living Facilities Injuries Due to Falls in Assisted Living Facilities CDC Data on Older Adult Falls (2018):- Prevalence: Falls are the leading cause of injury among adults aged 65 and older.- Incidence: 27.5% of older adults reported falling at least once in the past year, and 10.2% reported a fall-related injury.- Impact: In 2018, there were approximately 35.6 million falls and 8.4 million fall-related injuries among older adults.- Risk Factors: Older adults with difficulties in functional abilities (e.g., walking, climbing stairs, dressing) reported higher percentages of falls and fall-related injuries.- Geographic Variability: A higher percentage of older adults living in rural areas reported falls compared to those in urban areas.- STEADI Initiative: Focuses on providing healthcare providers with tools and resources to screen, assess, and intervene to reduce fall risk. It emphasizes the importance of clinical fall prevention programs and offers training and materials to support healthcare providers.

AHCA/NCAL Data on Falls in Assisted Living Facilities:- Annual Statistics: Each year, there are over 37 million falls among older adults, with 9 million resulting in injuries, 3 million in emergency department visits, 1 million in hospitalizations, and 36,000 deaths.- Screening and Prevention: The CDC Foundation launched a toolkit that includes Falls Free Check-ups aimed at preventing falls and fall-related injuries by developing and implementing risk factor prevention programs.

Additional Data:- SafelyYou Report: Assisted living communities report an average of 260 resident falls per year.- Impact on Care Levels: Approximately 24% of falls in assisted living result in moving residents to an increased level of care.- Quality of Care: Falls can impact staffing, quality of care, and consistency of care in senior living communities.- Economic Impact: The average cost of assisted living liability claims related to falls is $267,000 per claim.

The Inaugural 2022 State of Falls Report:- Prevalence: About 36 million people aged 65 and older experience a fall each year.- Economic Impact: $50 billion spent on medical costs related to non-fatal fall injuries annually.- Emotional Impact: Nearly half (45%) of American adults over 42 have experienced a fall in the past five years. Emotions following a fall include embarrassment/shame (44%), anxiety (43%), and fear about getting older (28%).- Move-Outs Due to Falls : 1 in 7 move-outs in assisted living communities are related to falls.

CDC Fall-Related Data:- Leading Cause of Injury: Falls are the leading cause of injury for adults aged 65 years and older.- Incidence: Over 14 million older adults report falling each year.- Injuries from Falls: About 37% of those who fall report an injury requiring medical treatment or restricting activity for at least one day, resulting in an estimated nine million fall injuries annually.- State Variability: Falls are common across all states but show variability.- Fall Deaths: Falls are the leading cause of injury-related death among adults 65 and older, with the age-adjusted fall death rate increasing by 41% from 2012 to 2021.

Fires in Sprinklered Assisted Living Facilities NFPA Report on Sprinklers:- Effectiveness: Sprinklers are highly effective in controlling fires. From 2017 to 2021, sprinklers operated in 92% of reported structure fires and were effective in 97% of those cases.- Impact on Fire Spread: In properties with sprinklers, 94% of fires were confined to the object or room of origin, compared to 70% in properties without automatic extinguishing systems (AES).- Injury and Death Reduction: Civilian fire death rates were 90% lower, and civilian injury rates were 32% lower in properties with sprinklers compared to those without.- Firefighter Safety: The rate of firefighter injuries per fire was 35% lower in properties with sprinklers.

AHCA/NCAL on Sprinklers:- Compliance Issues: Common issues include obstructions near sprinkler heads, improper attachments to sprinkler piping, and lack of proper maintenance and inspection.- Maintenance: Regular testing, inspection, and cleaning of sprinkler heads are crucial to ensure they operate effectively during a fire.- Training: Proper training for staff on how to maintain and inspect sprinkler systems is essential for compliance and safety.

General NFPA Data:- Residential Properties: In residential properties, sprinklers are present in only 8% of fires but are highly effective in controlling fire spread and reducing casualties and property damage.- Multiple-Death Fires: There has never been a multiple-death fire in a nursing home with a functional automatic sprinkler system.

Fire Systems Data:- Annual Response: Fire departments in the US respond to more than 1,800 fires within residential board and care facilities annually, including senior housing facilities.- Fire Containment: 88% of these fires do not spread beyond the area of origin due to stringent code requirements for fully functional fire sprinkler and detection systems.- Case Example: At the Victory Centre of Park Forest in Illinois, a single fire sprinkler controlled a fire started by an unattended stovetop. The resident was unharmed, and no other apartments were damaged.- Fire Impact: The majority of fires in assisted living facilities are confined fires that typically do not result in serious injury or property damage.

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Cost Impact: Decrease

Estimated Immediate Cost Impact:

The average cost of door closers, not including the cost of labor for installation, ranges from $150 to $600 dollars. The total decrease would depend on the number of sleeping room doors in the facility.

Estimated Immediate Cost Impact Justification (methodology and variables):

If a designer chooses to utilize this exception, closers would not be required on corridor doors.

FS67-24

IBC: 716.4, 716.4.1, 716.4.2, 716.4.3, TABLE 716.1(2), 716.4 (New), 716.4.1 (New), 716.4.2 (New), 716.4.2.1 (New), 716.4.2.2 (New), 716.4.2.3 (New), 716.4.3 (New), 716.4.4 (New)

Proposed Change as Submitted

Proponents: Paul Armstrong, McKEON (paul@7arms.com); Doug Zachary, McKEON, McKEON (dzachary@mckeondoor.com); David Dodge, McKEON (ddodge@mckeondoor.com)

2024 International Building Code

Delete without substitution:

~~**716.4 Fire protective curtain assembly.** *Approved fire protective curtain assemblies* shall be constructed of any materials or assembly of component materials tested without hose stream in accordance with UL 10D, and shall comply with the Sections 716.4.1 through 716.4.3.~~

~~**716.4.1 Label.** *Fire protective curtain assemblies* used as opening protectives in fire-rated walls and *smoke partitions* shall be*labeled* in accordance with Section 716.2.9.~~

~~**716.4.2 Smoke and draft control.** *Fire protective curtain assemblies* used to protect openings where smoke and draft control assemblies are required shall comply with Section 716.2.1.4.~~

~~**716.4.3 Installation.** *Fire protective curtain assemblies* shall be installed in accordance with NFPA 80.~~

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

Portions of table not shown remain unchanged.

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4		3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]			—				
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		$1\frac{1}{2}$	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Horizontal exits in fire walls[g]	4	3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3	3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1	1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
					Fire protection			
Other fire barriers	1	3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Fire partitions: Corridor walls	1	1/3[a,i]	Maximum size tested	D-20	3/4[a]		D-H-OH-45	
	0.5	1/3[a,i]	Maximum size tested	D-20	1/3		D-H-OH-20	
Other fire partitions	1	3/4[i]	Maximum size tested	D-H-45	3/4		D-H-45	
	0.5	1/3	Maximum size tested	D-H-20	1/3		D-H-20	
Exterior walls	3	1 1/2	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2	1 1/2	Maximum size tested	D-H 90 or D-H-W-90	1 1/2[h]	2	D-H-OH-90[h]	W-120
					Fire protection			
	1	3/4	Maximum size tested	D-H-45	3/4[h]		D-H-45[h]	
Smoke barriers					Fire protection			
	1	1/3[i]	Maximum size tested	D-20	3/4		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of 1 1/2 hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. *Fire protective curtain assemblies* in accordance with Section 716.4 shall be deemed equivalent in *fire protection rating* to 20-minute fire doors in *fire-resistance rated corridor* walls and *smoke barrier* walls.

Add new text as follows:

716.4 Fire protective curtain assemblies in corridors and smoke barriers. *Fire protective curtain assemblies* shall have a minimum *fire protection rating* of 20 minutes without the hose stream test where located in *corridor* walls and *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.1(2) and shall comply with the provisions of this section.

716.4.1 Testing requirements. Approved fire protective curtain assemblies shall be constructed of any materials or assembly of component materials that conforms to the following test requirements:

1. Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.
2. Fire protective curtain assemblies shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784.

716.4.2 Labeled protective assemblies. *Fire protective curtain assemblies* shall be labeled by an *approved agency*. The *labels* shall comply with NFPA 80, and shall be permanently affixed to the bottom bar.

716.4.2.1 Fire protective curtain assembly labeling requirements. *Fire protective curtain assemblies* shall be *labeled* showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency and the *fire protection rating*. Smoke and draft control assemblies complying with UL 1784 shall be *labeled* as such and shall comply with Section 716.4.2.3. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

716.4.2.2 Oversized assemblies. Oversized fire protective curtain assemblies shall bear an oversized label by an approved agency or shall be provided with a certificate of inspection furnished by an approved testing agency. Where a certificate of inspection is furnished by an approved testing agency, the certificate shall state that the fire protective curtain assembly conforms to the requirements of design, materials and construction, but has not been subjected to the fire test.

716.4.2.3 Smoke and draft control assembly labeling requirements. Smoke and draft control assemblies complying with UL 1784 shall be labeled in accordance with Section 716.4.2.1 and shall show the letter “S” on the fire-rating label of the assembly.

716.4.3 Installation. *Installation of fire protective curtain assemblies* in corridors and smoke barriers shall be in accordance with NFPA 105.

716.4.4 Means of egress. *Fire protective curtain assemblies* shall not be used as required *means of egress* doors in accordance with Section 1010.

Reason: The fire protective curtain assembly definition in Section 202 and the UL 10D test standard in Section 716.4 have been recognized by the IBC since they were added in the 2021 code cycle. However, the full inclusion of these opening protectives in the IBC is incomplete as there is no mention of fire protective curtain assemblies in Table 716.1(2) nor are there any references to Section 716.4 anywhere in the code. This code change connects those missing links and assigns fire protective curtain assemblies to their rightful place in the IBC.

UL 10D test criteria is essentially the same positive pressure fire endurance test criteria in UL 10C, but without the requirement for a hose stream integrity test at the end of the burn. Therefore, our current codes will only allow the use of UL 10D tested products where fire door assemblies are not required to meet hose stream performance. This condition only occurs in Section 716.2.2.1:

716.2.2.1 Door assemblies in corridors and smoke barriers.

Fire door assemblies required to have a minimum fire protection rating of 20 minutes where located in corridor walls or smoke barrier walls having a fire-resistance rating in accordance with Table 716.1(2) shall be tested in accordance with NFPA 252 or UL 10C without the hose stream test.

There were attempts in the 2024 code cycle to add the UL 10D test standard to Section 716.2.2.1. But these attempts were disapproved largely because it was determined that this section is not the correct location since Section 716.2 covers fire door assemblies and Section 716.2.2.1 specifically refers to Table 716.1(2) which does not currently contain a reference to fire protective curtain assemblies. Based on that feedback, this code change accomplishes the following:

First, since fire protective curtain assemblies are a separate category of opening protective in Section 716.4, they cannot simply be placed under the requirements for fire door assemblies in Section 716.2. The only place fire protective curtain assemblies and fire door assemblies can be linked is through Table 716.1(2), which encompasses opening protectives of all types. Actually adding fire protective curtain assemblies within Table 716.1(2) is a complex task and unnecessary due to the limited applications that a UL 10D tested product can be legitimately placed. The simpler and more effective approach is to add the proposed footnote “j.” to Table 716.1(2) where Section 716.4 is now referenced. This proposed note, in accordance with the applications described in Section 716.2.2.1, will only be applied to the minimum fire door and fire shutter assembly ratings for “Fire partitions: Corridor Walls” and “Smoke Barriers”.

Next, Section 716.4 requires a complete rewrite in order to align it specifically with these applications. Since fire protective curtain assemblies are only deemed equivalent in fire protection rating to 20 minute fire doors in fire-resistance rated corridor walls and smoke barrier walls, Section 716.4 is rewritten to include similar language and layout found in Section 716.2.2.1. Furthermore, the subsections have been reformatted to create consistency in the layout with fire door assemblies and fire window assemblies in Sections 716.2 and 716.3, respectively.

The fire testing requirements for fire protective curtain assemblies in corridors and smoke barriers remains unchanged from the previous edition of the IBC. Additionally, these assemblies shall also serve as smoke and draft control assemblies meeting the criteria for air leakage for fire door assemblies in corridors and smoke barriers in Section 716.2.2.1.1 and being tested in accordance UL 1784.

Labeling requirements for fire protective curtain assemblies in the previous edition of the code referred back to labeling requirements for fire door assemblies in Section 716.2.9 which do not all apply to these types of opening protectives. Fire protective curtain assemblies have their own dedicated chapter in NFPA 80 and have been recognized as a separate and distinct category of opening protective by the IBC. This code change acknowledges the labeling requirements specific to fire protective curtain assemblies and has been structured in a format that is consistent with fire door assemblies.

Installation of all rated opening protectives must comply with NFPA 80 as required by Section 716.1. It is redundant and unnecessary to repeat this requirement in Section 716.4 so it has been removed in this code change. However, it is necessary to require fire protective curtain assemblies in corridors and smoke barriers to additionally be installed in accordance with NFPA 105 because of the smoke and draft control requirements. These installation requirements are consistent with fire door assemblies in the same applications as required by Section 716.2.10.

Finally, this code change confirms these products shall not be used as required means of egress doors. Fire protective curtain assemblies currently available in the market include many different features or options to travel through the opening protectives. These options include swinging flaps, grab straps, pass-through slots, push-to-open buttons and delayed deployment. None of these options that currently exist in fire protective curtain assemblies comply with means of egress doors in Section 1010.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal recognizes the current practice of testing and use of these assemblies.

FS67-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata **See below requirement #2 correct text:716.4.1 Testing requirements.** Approved fire protective curtain assemblies shall be constructed of any materials or assembly of component materials that conforms to the following test requirements:

1. Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.
2. ~~Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.~~ Fire protective curtain assembl control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784.

Committee Action: **Disapproved**

Committee Reason: The committee determined that the proposed language is confusing between the sections indicated in the code proposal. The committee has an issue with the means of egress portion of the proposal. The committee has an issue with the table footnote and mentioned that the text needs to be revised from "deemed equivalent" to "the same test" (Vote: 12-0).

FS67-24

Individual Consideration Agenda

Comment 1:

IBC: TABLE 716.1(2), 716.4, 716.4.1, 716.4.2, 716.4.2.1, 716.4.2.2, 716.4.2.3, 716.4.3, 716.4.4

Proponents: Paul Armstrong, McKEON; Doug Zachary, McKEON (dzachary@mckeondoor.com); David Dodge, McKeon Door Company, McKEON (ddodge@mckeondoor.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

TABLE 716.1(2) OPENING FIRE PROTECTION ASSEMBLIES, RATINGS AND MARKINGS

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)	MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE[a]	FIRE-RATED GLAZING MARKING DOOR VISION PANEL[b, c]	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
					Fire protection	Fire resistance	Fire protection	Fire resistance
Fire walls and fire barriers having a required fire-resistance rating greater than 1 hour	4	3	See Note a	D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3	3[d]	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180

TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING (hours)		MINIMUM FIRE DOOR AND FIRE SHUTTER ASSEMBLY RATING (hours)	DOOR VISION PANEL SIZE	FIRE-RATED GLAZING MARKING DOOR VISION PANEL	MINIMUM SIDELIGHT/TRANSOM ASSEMBLY RATING (hours)		FIRE-RATED GLAZING MARKING SIDE-LIGHT/TRANSOM PANEL	
						Fire protection	Fire resistance	Fire protection	Fire resistance
	2		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.=D-H-W-90	Not Permitted	2	Not Permitted	W-120
	$1\frac{1}{2}$		$1\frac{1}{2}$	100 sq. in.	≤100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	$1\frac{1}{2}$	Not Permitted	W-90
Double fire walls constructed in accordance with NFPA 221	Single-wall assembly rating (hours)[e]	Each wall of the double-wall assembly (hours)[f]			—				
	4	3	3	See Note a	D-H-W-180	Not Permitted	3	Not Permitted	W-180
	3	2	$1\frac{1}{2}$	100 sq. in.	≤ 100 sq. in. = D-H-90 >100 sq. in.= D-H-W-90	Not Permitted	2	Not Permitted	W-120
	2	1	1	100 sq. in.	≤ 100 sq. in. = D-H-60 > 100 sq. in. = D-H-W-60	Not Permitted	1	Not Permitted	W-60
Enclosures for shafts, interior exit stairways and interior exit ramps.	2		$1\frac{1}{2}$	100 sq. in.[b]	≤100 sq. in. = D-H-90 > 100 sq. in.= D-H-T-W-90	Not Permitted	2	Not Permitted	W-120
Horizontal exits in fire walls[g]	4		3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-240	Not Permitted	4	Not Permitted	W-240
	3		3[d]	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.=D-H-W-180	Not Permitted	3	Not Permitted	W-180
Fire barriers having a required fire-resistance rating of 1 hour: Enclosures for shafts, exit access stairways, exit access ramps, interior exit stairways and interior exit ramps; and exit passageway walls	1		1	100 sq. in.	≤100 sq. in. = D-H-60 >100 sq. in.=D-H-T-W-60	Not Permitted	1	Not Permitted	W-60
						Fire protection			
Other fire barriers	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$[h]		D-H-45[h]	
Fire partitions: Corridor walls	1		$\frac{1}{3}$[a,j]	Maximum size tested	D-20	$\frac{3}{4}$[a]		D-H-OH-45	
	0.5		$\frac{1}{3}$[a,j]	Maximum size tested	D-20	$\frac{1}{3}$		D-H-OH-20	
Other fire partitions	1		$\frac{3}{4}$[i]	Maximum size tested	D-H-45	$\frac{3}{4}$		D-H-45	
	0.5		$\frac{1}{3}$	Maximum size tested	D-H-20	$\frac{1}{3}$		D-H-20	
Exterior walls	3		$1\frac{1}{2}$	100 sq. in.[a]	≤100 sq. in. = D-H-90 > 100 sq. in = D-H-W-90	Not Permitted	3	Not Permitted	W-180
	2		$1\frac{1}{2}$	Maximum size tested	D-H 90 or D-H-W-90	$1\frac{1}{2}$[h]	2	D-H-OH-90[h]	W-120
						Fire protection			
	1		$\frac{3}{4}$	Maximum size tested	D-H-45	$\frac{3}{4}$[h]		D-H-45[h]	
Smoke barriers						Fire protection			
	1		$\frac{1}{3}$[j]	Maximum size tested	D-20	$\frac{3}{4}$		D-H-OH-45	

For SI: 1 square inch = 645.2 mm.

a. Fire-resistance-rated glazing tested to ASTM E119 in accordance with Section 716.1.2.3 shall be permitted, in the maximum size tested.

b. Under the column heading “Fire-rated glazing marking door vision panel,” W refers to the fire-resistance rating of the glazing, not the frame.

c. See Section 716.1.2.2.1 and Table 716.1(1) for additional permitted markings.

d. Two doors, each with a fire protection rating of $1\frac{1}{2}$ hours, installed on opposite sides of the same opening in a fire wall, shall be deemed equivalent in fire protection rating to one 3-hour fire door.

e. As required in Section 706.4.

f. As allowed in Section 4.6 of NFPA 221.

g. See Section 716.2.5.1.2.

h. Fire-protection-rated glazing is not permitted for fire barriers required by Section 1207 of the *International Fire Code* to enclose energy storage systems. Fire-resistance-rated glazing assemblies tested to ASTM E119 or UL 263, as specified in Section 716.1.2.3, shall be permitted.

i. Two doors, each with a fire rating of 20 minutes, installed on opposite sides of the same opening in a fire partition, shall be deemed equivalent in fire protection rating to one 45-minute fire door.

j. *Fire protective curtain assemblies* in accordance with Section 716.4 shall be deemed equivalent in *fire protection rating* to 20-minute fire doors in ~~*fire-resistance-rated corridor* walls and *smoke barrier* walls~~ accordance with Section 716.2.2.1.

716.4 Fire protective curtain assemblies in corridors and smoke barriers. *Fire protective curtain assemblies* shall have a minimum *fire protection rating* of 20 minutes without the hose stream test where located in *corridor* walls and *smoke barrier* walls having a *fire-resistance rating* in accordance with Table 716.1(2) and shall comply with the provisions of this section.

716.4.1 Testing requirements. Approved fire protective curtain assemblies shall be constructed of any materials or assembly of component materials that conforms to the following test requirements:

1. Fire protective curtain assemblies shall be tested without hose stream in accordance with UL 10D.
2. Fire protective curtain assemblies shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784.

716.4.2 Labeled protective assemblies. *Fire protective curtain assemblies* shall be labeled by an *approved agency*. The *labels* shall comply with NFPA 80, and shall be permanently affixed to the bottom bar.

716.4.2.1 Fire protective curtain assembly labeling requirements. *Fire protective curtain assemblies* shall be *labeled* showing the name of the manufacturer or other identification readily traceable back to the manufacturer, the name or trademark of the third-party inspection agency ~~and~~ the *fire protection rating* *and show the letter "S" to confirm compliance with UL 1784 as smoke and draft control doors*. ~~Smoke and draft control assemblies complying with UL 1784 shall be *labeled* as such and shall comply with Section 716.4.2.3. Labels shall be approved and permanently affixed.~~ The label shall be applied at the factory or location where fabrication and assembly are performed.

716.4.2.2 Oversized assemblies. Oversized fire protective curtain assemblies shall bear an oversized label by an approved agency or shall be provided with a certificate of inspection furnished by an approved testing agency. Where a certificate of inspection is furnished by an approved testing agency, the certificate shall state that the fire protective curtain assembly conforms to the requirements of design, materials and construction, but has not been subjected to the fire test.

~~**716.4.2.3 Smoke and draft control assembly labeling requirements.** Smoke and draft control assemblies complying with UL 1784 shall be labeled in accordance with Section 716.4.2.1 and shall show the letter "S" on the fire-rating label of the assembly.~~

~~**716.4.3 Installation.** *Installation of fire protective curtain assemblies* in corridors and smoke barriers shall be in accordance with NFPA 105.~~

716.4.3~~4~~ Means of egress. *Fire protective curtain assemblies* shall not be used as required *means of egress* doors in accordance with Section 1010.

Reason: This code change does not increase the market potential for fire protective curtain assemblies. FS67 is intended to provide clear guidelines within the code as to where and when they can be used safely and legitimately.

The current language, Section 716.4 Fire protective curtain assembly, does not provide clear and concise direction for the use of these fire protective curtains as opening protectives in the IBC. It is incomplete and leaves room for misinterpretation as evidenced by several attempts since the 2015 code development cycle to bring clarity in the application of these provisions.

There is no mention of fire protective curtain assemblies in Table 716.1(2) nor are there any references to Section 716.4 anywhere in the code. These major holes in the code make it difficult to enforce and appropriately apply the code to these systems and they are often misapplied due to this lack of direction. This code change connects those missing links and assigns fire protective curtain assemblies to their rightful place in the IBC.

One helpful connection is that without a hose stream test, fire protective curtain assemblies tested to UL 10D only meet the fire protection rating of 20-minute fire doors in corridors and smoke barrier walls. All other opening protectives require a hose stream performance test and fire protective curtain assemblies cannot be applied in any walls requiring opening protectives to be rated higher than 20 minutes. Examples of where they cannot be used are anytime a Fire Barrier wall is required such as shafts, occupancy separations, etc. This code change clarifies that fire protective curtains are not the same as hose-stream tested opening protectives.

It was clear there is overwhelming support to better define the use of these products when this code change was proposed in CAH #1 of this code cycle. We listened to the concerns of the structure of this code change presented by the opponents and committee and have addressed them with the edits in this updated code change proposal.

During CAH #1, a comment was made by a committee member regarding the language in footnote j and the need to clarify that fire protective curtain assemblies would undergo the same test as a 20-minute fire door. This revised code change addresses that comment with the new language that deems fire protective curtain assemblies equivalent to 20-minute fire doors in accordance with Section 716.2.2.1. In other words, fire protective curtain assemblies tested to UL 10D do undergo the same testing requirements as UL 10C without hose stream for these 20-minute applications. We feel this change satisfies the comment from the committee member.

There were also comments from the committee and opponents regarding the layout of the testing and installation requirements in the original proposal. We agree with those comments and therefore this revised code change proposal has been cleaned up to avoid any confusion.

Finally, there were concerns expressed in CAH #1 that this code change would allow for the use of fire protective curtain assemblies to replace swinging egress doors in a means of egress system. This code change does the opposite. The language in this code change specifically states that fire protective curtain assemblies SHALL NOT be used as means of egress doors.

There are applications in which a 20-minute fire rating without hose stream is acceptable, yet not as a required element in a means of egress system. Included are photos of those applications. The intended purpose of this code change is to limit the use of fire protective curtain assemblies to only these applications that do not require egress.

The following photos are examples of corridor separation in two-story openings where egress through the assembly is not required:

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal, like the original code change, is to clarify the current intended application of the IBC for these assemblies.

Comment (CAH2)# 738

FS69-24

IBC: TABLE 717.3.2.1; IMC®: [BF] TABLE 607.3.2.1

Proposed Change as Submitted

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Building Code

Revise as follows:

TABLE 717.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hours)
Less than 3-hour fire-resistance-rated assemblies	1.5
3-hour or greater fire-resistance-rated assemblies	3

a. Corridor fire dampers shall also comply with the provisions of section 717.3.2.4.

2024 International Mechanical Code

Revise as follows:

[BF] TABLE 607.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hour)
Less than 3-hour fire-resistance-rated assemblies	$1\frac{1}{2}$
3-hour or greater fire-resistance-rated assemblies	3

a. Corridor fire dampers shall also comply with the provisions of section 607.3.2.4.

Reason: When looking for the required rating for fire dampers, users may consult Table 717.3.2.1 and determine the rating based solely on the information in this table, without noticing the provisions for corridor fire dampers in Section 717.3.2.4. The proposed change adds a footnote to Table 717.3.2.1 which references Section 717.3.2.4, to ensure users are aware of the corridor fire damper provisions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change adds a reference to an existing section into the footnotes for an existing table. This change is for clarification only and does not add any provisions.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee did not approve adding the proposed text. The committee indicated that the proposed text needs more clarification (Vote: 12-0).

Individual Consideration Agenda

Comment 1:

IBC: TABLE 717.3.2.1; IMC®: [BF] TABLE 607.3.2.1

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

TABLE 717.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hours)
Less than 3-hour fire-resistance-rated assemblies	1.5
3-hour or greater fire-resistance-rated assemblies	3

a. The requirements of this table are not applicable to *corridor dampers.* ~~Corridor fire dampers shall also comply with the provisions of~~ See section 717.3.2.4 for corridor damper provisions.

2024 International Mechanical Code

Revise as follows:

[BF] TABLE 607.3.2.1 FIRE DAMPER RATING[a]

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hour)
Less than 3-hour fire-resistance-rated assemblies	$1^1/_2$
3-hour or greater fire-resistance-rated assemblies	3

a. The requirements of this table are not applicable to *corridor dampers.* ~~Corridor fire dampers shall also comply with the provisions of~~ See section 607.3.2.4 for corridor damper provisions.

Reason: NYSDOS has received numerous questions regarding how to apply the Table 717.3.2.1 of the IBC (Table 607.3.2.1 of the IMC) requirements to corridor dampers. However, this table provides requirements for fire dampers, not corridor dampers. Fire dampers prevent the passage of fire, but are not specifically designed to limit the spread of smoke. Corridor dampers are a specific type of damper that is only utilized in ducts which penetrate corridor ceilings in fire-resistance-rated corridors - ceilings which are permitted to be constructed as required for corridor walls. Corridor dampers act as both fire and smoke dampers, preserving the horizontal barrier created by the ceiling.

The modified proposal is intended to clearly delineate that Table 717.3.2.1 (Table 607.3.2.1 of the IMC) should not be used for corridor dampers, and provide a reference to Section 717.3.2.4 of the IBC (Section 607.3.2.4 of the IMC), which provides requirements for corridor dampers. This pointer, included as a footnote to the table, should direct users to the proper requirements for the type of damper they intend to use, and limit the incorrect use of this table to provide requirements for corridor dampers. Corridor dampers are required to be 1 hour fire-resistance-rated, while the shortest allowed fire resistance rating for fire dampers is 1.5 hours. This pointer will ensure the appropriate level of protection for corridor ceiling penetrations while ensuring that corridor dampers are not over-designed or over-built.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed modification, as well as the original proposal, merely add a pointer to the correct section for corridor damper requirements. No new requirements are added.

Comment (CAH2)# 417

FS75-24

IBC: 717.6.1; IMC®: [BF] 607.6.1

Proposed Change as Submitted

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Building Code

Revise as follows:

717.6.1 Through penetrations. A duct constructed of *approved* materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two *stories*is permitted without *shaft enclosure* protection, provided that a *listed fire damper* is installed at the floor line or the duct is protected in accordance with Section 714.5. For air transfer openings, see Section 712.1.9. **Exceptions:**

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a *fire damper* at each floor, provided that such duct meets all of the following requirements:
   - ~~1~~ 1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum wall thickness of 0.0187 inches (0.4712 mm) (No. 26 gage).
   - ~~2~~ 1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.
   - ~~3~~ 1.3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
   - ~~4~~ 1.4. The *annular space* around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.
   - ~~5~~ 1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 717.6.2.1.2
2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose in accordance with nationally recognized standards for such enclosure materials, and penetrations comply with the requirements of Section 714.5 of the International Building Code.

2024 International Mechanical Code

Revise as follows:

[BF] 607.6.1 Through penetrations. A duct constructed of *approved* materials in accordance with Section 603 that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided that a *listed* fire damper is installed at the floor line or the duct is protected in accordance with Section 714.5 of the International Building Code. For air transfer openings, see Item 6, Section 712.1.9 of the International Building Code.

~~**Exception**~~ **Exceptions:**

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a fire damper at each floor provided that it meets all of the following requirements:

   ~~1~~ 1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage).

   ~~2.~~ 1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.

   ~~3.~~ 1.3. The duct shall not exceed a 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches for any 100 square feet (64 516 mm^2 per 9.3 m^2) of the floor area.

   ~~4.~~ 1.4. The annular space around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

   ~~5.~~ 1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 607.6.2.1.

2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose in accordance with nationally recognized standards for such enclosure materials, and penetrations comply with the requirements of Section 714.5 of the International Building Code.

Reason: This proposal provides an additional option for ducts that penetrate three or less floors. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness.

The many Listings for fire-resistant duct systems provide an alternate to required fire dampers when ducts pass through a fire separation. They also cover criteria to assess performance as shaft enclosures for vertical ducts.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

FS75-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee mentioned that the proposed text needs more work and the language needs to be specific. The committee indicated that there is a lack of data to support the proposed text. The committee suggested adding the proper standard (Vote: 11-0).

FS75-24

Individual Consideration Agenda

Comment 1:

IBC: 717.6.1; IMC®: [BF] 607.6.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

717.6.1 Through penetrations. A duct constructed of *approved* materials in accordance with the *International Mechanical Code* that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two *stories* is permitted without *shaft enclosure* protection, provided that a *listed fire damper* is installed at the floor line or the duct is protected in accordance with Section 714.5. For air transfer openings, see Section 712.1.9. **Exceptions:**

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a *fire damper* at each floor, provided that such duct meets all of the following requirements:
   1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum wall thickness of 0.0187 inches (0.4712 mm) (No. 26 gage).
   1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.
   1.3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) in any 100 square feet (9.3 m^2) of floor area.
   1.4. The *annular space* around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch of water (2.49 Pa) at the location of the penetration for the time period equivalent to the *fire-resistance rating* of the construction penetrated.
   1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 717.6.2.1.2

2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a tested, classified, listed and labeled system using the standard time-temperature curve of ASTM E119 or UL 263, specifically evaluated for such purpose. ~~in accordance with nationally recognized standards for such enclosure materials, and penetrations~~ Penetrations shall comply with the requirements of Section 714.5 of the International Building Code.

2024 International Mechanical Code

[BF] 607.6.1 Through penetrations. A duct constructed of *approved* materials in accordance with Section 603 that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided that a *listed* fire damper is installed at the floor line or the duct is protected in accordance with Section 714.5 of the International Building Code. For air transfer openings, see Item 6, Section 712.1.9 of the International Building Code.

Exceptions:

1. In occupancies other than Groups I-2 and I-3, a duct is permitted to penetrate three floors or less without a fire damper at each floor provided that it meets all of the following requirements:

   1.1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage).

   1.2. The duct shall open into only one *dwelling unit* or *sleeping unit* and the duct system shall be continuous from the unit to the exterior of the *building*.

   1.3. The duct shall not exceed a 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches for any 100 square feet (64 516 mm^2 per 9.3 m^2) of the floor area.

   1.4. The annular space around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E119 or UL 263 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.

   1.5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a *listed ceiling radiation damper* installed in accordance with Section 607.6.2.1.

2. A duct is permitted to penetrate three floors or less without a fire damper at each floor provided the surface of the duct is continuously covered on all sides from a point at which the duct penetrates a ceiling or floor to the outlet terminal with a tested, classified, listed and labeled system using the standard time-temperature curve of ASTM E119 or UL 263, specifically evaluated for such purpose. ~~in accordance with nationally recognized standards for such enclosure materials, and penetrations~~ Penetrations shall comply comply with the requirements of Section 714.5 of the International Building Code.

Reason: This proposal provides an additional option for ducts that penetrate three or less floors. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness. All of the Listings are based on the ASTM E119, UL 263 or equivalent time-temperature exposure.

The many Listings for fire-resistant duct systems provide an alternate to required fire dampers when ducts pass through a fire separation. They also cover criteria to assess performance as shaft enclosures for vertical ducts.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

Comment (CAH2)# 431

FS76-24

IBC: 717.6.2.1.1, 717.6.2.1.2; IMC®: [BF] 607.6.2.1.1, [BF] 607.6.2.1.2

Proposed Change as Submitted

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com)

2024 International Building Code

Revise as follows:

717.6.2.1.1 Dynamic systems. Only *ceiling radiation dampers labeled* for use in dynamic systems shall be installed in heating, *ventilation* and air-conditioning systems that do not automatically shut down~~designed to operate with fans on~~ during a fire.

717.6.2.1.2 Static systems. Static *ceiling radiation dampers* shall only be installed in ~~provided with~~ systems that ~~are~~ automatically shut down in the event of~~not designed to operate during~~ a fire. ~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a *smoke detector* shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes in the duct shall be within 5 feet (1524 mm) of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local *smoke detectors* require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed in the same room or area as the *ceiling radiation damper.*~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed in a room where an occupant sensor is provided within the room that will shut down the system.~~

2024 International Mechanical Code

Revise as follows:

[BF] 607.6.2.1.1 Dynamic systems. *Ceiling radiation dampers* installed in heating, ventilation and air-conditioning systems that do not automatically shut down~~designed to operate with fans on~~ during a fire shall be labeled for use in dynamic systems.

[BF] 607.6.2.1.2 Static systems. Static *ceiling radiation dampers* shall only be installed ~~only~~ in systems that automatically shut down in the event of~~are not designed to operate during~~ a fire.

~~**Exceptions:**~~

1. ~~Where a static *ceiling radiation damper* is installed at the opening of a duct, a smoke detector shall be installed inside the duct or outside the duct with sampling tubes protruding into the duct. The detector or tubes within the duct shall be within 5 feet (1524 mm) of the damper. Air outlets and inlets shall not be located between the detector or tubes and the damper. The detector shall be *listed* for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.~~
2. ~~Where a static *ceiling radiation damper* is installed in a ceiling, the *ceiling radiation damper* shall be permitted to be controlled by a smoke detection system installed within the same room or area as the *ceiling radiation damper.*~~
3. ~~A static *ceiling radiation damper* shall be permitted to be installed within a room where an occupant sensor is provided within the room that will shut down the system.~~

Reason:

The changes to Sections 717.6.2.1.1 and 717.6.2.1.2 are editorial and align the description of dynamic and static systems with the code language already used in IBC section 717.2.3 outlining static dampers.

Exception 1 and Exception 2 are not exceptions to the charging language, but rather are specific methods for automatically shutting down a system in the event of a fire. Additionally, exception 2 as written, allows a static rated ceiling radiation damper to be controlled by a smoke detector without shutting down the system. This would result in the static damper having to close under airflow, which it is not listed to do.

Exception 3 does outline a true exception to the charging language as it describes a method for shutting down the system other than in the event of a fire. However, using an occupancy sensor to shut down the system could still result in the static rated damper having to close under airflow because many occupancy sensors utilize a delay prior to shutting the system down.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes will not impact the cost of construction as they are only editorial and align system definitions with existing code language.

FS76-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee agreed with the concept of the proposal but the language needs to be correlated better for the CAH2 (Vote: 11-0).

FS76-24

Individual Consideration Agenda

Comment 1:

IBC: 717.6.2.1.1; IMC®: [BF] 607.6.2.1.1

Proponents: Amanda Hickman, The Hickman Group, Air Movement and Control Association International, Inc. (AMCA) (amanda@thehickmangroup.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

717.6.2.1.1 Dynamic systems. Only *ceiling radiation dampers labeled* for use in dynamic systems shall be installed in heating, *ventilation* and air-conditioning systems that do not automatically shut down during a fire.

Exception: *Ceiling radiation dampers* tested and *listed* in combination with specific fan models shall not be required to be *labeled* for dynamic systems.

2024 International Mechanical Code

Revise as follows:

[BF] 607.6.2.1.1 Dynamic systems. *Ceiling radiation dampers* installed in heating, ventilation and air-conditioning systems that do not automatically shut down during a fire shall be labeled for use in dynamic systems.

Exception: *Ceiling radiation dampers* tested and *listed* in combination with specific fan models shall not be required to be *labeled* for dynamic systems.

Reason:
Proposals FS76 and FS77 were both submitted in an attempt to clarify the current language which was originally intended to provide direction on various ceiling radiation damper (CRD) installations, where the static CRD will perform as intended because a static condition had been created. In reviewing the existing code language, it became apparent that the current exceptions to Section 717.6.2.1.2 are not exceptions to a static system, but are describing various methods of changing a dynamic condition into a static condition, which would then allow for the use of a static CRD. If those exceptions are kept in the code, they create confusion, as well as place limitations on what can be done to make the installation a static condition during a fire event.

Thus, the proponents of FS76 and FS77 worked together after each requested disapproval of our respective proposals at the first committee action hearing in order to work out an acceptable solution. This Public Comment represents that agreed solution. The committee indicated that they liked the clarity of FS76 so we built upon that structure to add a clean and concise exception to the dynamic section which provides a codified means to shutting down the system in a manner where a static CRD will perform as intended.

The proposed exception to Dynamic Systems outlines a scenario in which a ceiling radiation damper, though labeled as a static CRD, has been tested and certified to function correctly under fire conditions when paired with specific fan models. These combinations can either be integrated at the factory or assembled separately for use in the field in accordance with the CRD manufacturer's installation instructions. There are several different manufacturers who have obtained testing and third party certification of these combinations in accordance with UL 555C, which is already referenced in the code. If this proposed language is approved for inclusion in the 2027 code, we recommend updating the current commentary for this section to incorporate the aforementioned information.

This approach maintains the integrity and performance of fire-rated assemblies while providing clear guidance for practical implementation. Furthermore, the public comment enhances the clarity and application of the provisions concerning ceiling radiation dampers in both static and dynamic systems. This collaborative effort addresses the committee's feedback and provides a viable comprehensive solution for industry practitioners.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes will not impact the cost of construction as they are only editorial and align system definitions with existing code language. Allowing the use of static CRDs that are tested and listed in combination with specific fan models provides another installation option for the installer.

Comment (CAH2)# 282

FS79-24

IBC: 718.2.1, AWC Chapter 35 (New)

Proposed Change as Submitted

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org)

2024 International Building Code

Revise as follows:

718.2.1 Fireblocking materials. *Fireblocking* shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) *wood structural panels* with joints backed by 0.719-inch (18.3 mm) *wood structural panels*.
4. One thickness of 0.75-inch (19.1 mm) *particleboard* with joints backed by 0.75-inch (19 mm) *particleboard*.
5. One-half-inch (12.7 mm) *gypsum board*.
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.
8. Cellulose insulation tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
9. *Mass timber* complying with Section 2304.11.
10. One thickness of $^{19}/_{32}$-inch (15.1 mm) *fire-retardant-treated wood* structural panel complying with Section 2303.2.
11. Fireblocking materials in accordance with ANSI/AWC FDS.

Add new standard(s) as follows:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

ANSI/AWC FDS-2024: Fire Design Specification (FDS) for Wood Construction

Reason: This proposal recognizes fireblocking materials in accordance with ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction* Section 2.5.2 and adds a new reference to that standard in the code. The FDS includes prescriptive options for wood fireblocking of structural composite lumber and engineered wood rim board and for use of other wood members and wood protection materials designed in accordance with Chapter 3 of ANSI/AWC FDS to limit the passage of flames for at least 15 minutes. The minimum performance time of 15 minutes is based on performance associated with ½" gypsum board in Item 5 of IBC Section 718.2.1.

The FDS was developed as an American National Standard through the AWC ANSI-approved consensus standards development process, and is available on the AWC website at the following location: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Bibliography: ANSI/AWC *2024 Fire Design Specification (FDS) for Wood Construction*. View this document online: https://awc.org/wp-content/uploads/2023/11/AWC_FDS2024_20231103_AWCWEBSITE.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal provides a reference to the FDS, which contains additional options for fireblocking materials which are not currently listed in Section 718.2.1, such as structural composite lumber and engineered wood rim board. The inclusion of this additional option does not in and of itself increase or decrease the overall cost impact of the code, because this option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

FS79-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal due to the fact that the text only referred to the standard. The committee suggested that more details need to be added to the proposed text instead of only referring to the standard (Vote: 10-1).

FS79-24

Individual Consideration Agenda

Comment 1:

IBC: 718.2.1, AWC Chapter 35

Proponents: Edward Lisinski, American Wood Council (elisinski@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

718.2.1 Fireblocking materials. *Fireblocking* shall consist of the following materials:

1. Two-inch (51 mm) nominal lumber.
2. Two thicknesses of 1-inch (25 mm) nominal lumber with broken lap joints.
3. One thickness of 0.719-inch (18.3 mm) *wood structural panels* with joints backed by 0.719-inch (18.3 mm) *wood structural panels.*
4. One thickness of 0.75-inch (19.1 mm) *particleboard* with joints backed by 0.75-inch (19 mm) *particleboard.*
5. One-half-inch (12.7 mm) *gypsum board.*
6. One-fourth-inch (6.4 mm) cement-based millboard.
7. Batts or blankets of *mineral wool*, *mineral fiber* or other *approved* materials installed in such a manner as to be securely retained in place.

8. Cellulose insulation tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
9. *Mass timber* complying with Section 2304.11.
10. One thickness of $^{19}/_{32}$-inch (15.1 mm) *fire-retardant-treated wood* structural panel complying with Section 2303.2.
11. ~~Fireblocking materials in accordance with ANSI/AWC FDS.~~ One layer of 1 1/8-inch (29 mm) *structural composite lumber.*
12. One layer of 1 1/8-inch (29 mm) *engineered wood rim board.*

Delete without substitution:

AWC

American Wood Council
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

~~ANSI/AWC FDS-2024:~~ ~~Fire Design Specification (FDS) for Wood Construction~~

Reason: This proposal adds one layer of 1⅛-inch thick structural composite lumber and one layer of 1⅛-inch thick engineered wood rim board to the prescriptive list of approved fireblocking materials in Section 718.2.1. In Committee Action Hearing #1, the Code Development Committee recommended adding specific materials to the prescriptive list of fireblocking materials instead of making a reference to the ANSI/AWC *Fire Design Specification (FDS) for Wood Construction*. By directly including these materials in the list, builders and designers have additional options for fireblocking without having to reference another document. The reference to the FDS was removed as it no longer is proposed to be referenced in this particular section, however it should be noted that the justification for inclusion of these materials as acceptable fireblocking materials can be found in the FDS.

Note that the proposed language in this comment follows the formatting for the rest of this section that was approved by the committee in FS78-24. The unchanged portions of this section are not intended to revert back to the current code language. It is intended that they should continue to be modified as approved in FS78-24.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 This proposal may or may not decrease the cost of construction if these materials are used, but it cannot increase the cost of construction because these materials are not required to be used. Any existign method of providing fireblocking can still be used if this proposal is accepted.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is not a mandatory proposal and all existing methods of providing fireblocking are still preserved. These additional materials provide more options for a designer or builder. If a designer or builder does not want to use these materials, they can continue to build with whatever code compliant fireblocking materials they are currently using or specifying. However, if they have excess engineered wood products on a job site, or if these materials are used in a construction detail, by approving this proposal they could then be used as fireblocking. This could potentially decrease the cost of construction, reduce waste and/or reduce the need for additional fireblocking materials to be installed.

Comment (CAH2)# 25

FS85-24

IBC: SECTION 722, 722.1

Proposed Change as Submitted

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org); Jon-Paul Cardin, The CFSteel Group, The CFSteel Group (jp@cfsteelgroup.org)

2024 International Building Code

SECTION 722
CALCULATED FIRE RESISTANCE

Revise as follows:

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies and composite steel and concrete assemblies shall be permitted in accordance with AISC 360 Appendix 4, Section 4.3 ~~Chapter 5 of ASCE 29~~.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: This proposal is one of three that fully update Chapter 7 provisions of the IBC to reflect current structural steel industry standards. The 2024 edition of the IBC has already adopted the 2022 edition of AISC 360, *Specification for Structural Steel Buildings*, in Chapter 35 and elsewhere (Sections 722.5.2.2.1, 1604.3.3, 1705.2.1, 2202.1, and 2202.2.1.1). The purpose of this proposal is to update the methodology for the calculation of fire resistance for structural steel assemblies to recognize the applicable portion of AISC 360-22's mandatory Appendix 4, Structural Design for Fire Conditions (specifically Appendix 4, Section 4.3). The proposal also expands the reference to include composite steel and concrete assemblies, which are newly added in the 2022 edition of AISC 360, Appendix 4, Section 4.3.

Since the 2003 edition, the IBC has included ASCE 29, *Standard Calculation Methods for Structural Fire Protection,* as the only means to calculate the fire resistance of steel assemblies. The first edition of ASCE 29 referenced in the 2003 IBC was the 1999 edition; today, the 2024 IBC references the 2005 edition (although the 11/1/23 IBC-24 errata notes a 2017 edition; however, it is not available on the ASCE website for purchase as of 1/8/24). Since the 2006 edition of the IBC, the IBC has mandated AISC 360 as the basis for the design, fabrication, and erection of structural steel buildings. The first edition of AISC 360 referenced in the 2006 IBC was the 2005 edition, and today, the 2024 IBC references the 2022 edition.

In 2005, the committee charged with the development of AISC 360 created a new AISC 360 Appendix 4, Section 4.3 to provide calculation methods for establishing fire-resistance ratings of steel assemblies that would otherwise be determined by standard testing. AISC 360-05, Appendix 4, Section 4.3 also included a direct reference to the ASCE 29-05 calculation procedures for determining the fire-resistance ratings of steel assemblies. While intervening editions of AISC 360 Appendix 4, Section 4.3 have included this reference to ASCE 29-05, for the 2022 edition of AISC 360, the committee chose to extract the applicable calculation procedures directly from ASCE 29-05 and combine them with newly developed provisions. So, the 2024 IBC now effectively includes references to two (2) documents containing the same material on the prescriptive calculation of fire resistance for steel assemblies. However, while ASCE 29 has remained static, the methodology now found in Appendix 4, Section 4.3 of AISC 360-22 has been enhanced to reflect the latest requirements based on research, analysis, and testing. By deleting the direct reference to ASCE 29 and, instead, referencing AISC 360,

this proposal streamlines the IBC by citing only one (1) document with the most complete and up-to-date provisions for determining the fire resistance of steel assemblies and composite steel and concrete assemblies.

AISC makes its standards available to all free of charge. AISC 360-22 can be downloaded for free from https://www.aisc.org/publications/steel-standards/. Please refer to the full AISC 360-22 commentary for technical background and guidance on applying the provisions.

From the AISC-360 Commentary on Appendix 4, Section 4.3: "The primary source of accepted fire-resistance calculations for structural steel has been AISI and its ASTM E119 fire research conducted throughout the 1970s and 1980s. These industry-sponsored developments were originally captured in three AISI design guide publications (AISI, 1980, 1981, 1984), which were subsequently included in the preceding and current editions of Section 5 of SEI/ASCE/SFPE Standard 29, Standard Calculation Methods for Structural Fire Protection (ASCE, 2005) and in the U.S. model building codes. More recently, all of this information was summarized and well illustrated in AISC Design Guide 19. The standard fire protection and fire-resistance calculation methods for structural steel have now also been consistently transferred into the current National Fire Protection Association (NFPA) and International Code Council (ICC) model building codes. The inclusion of provisions for fire-resistance calculations in this Specification was motivated by AISC's and the steel industry's interest in duly maintaining this important content and contributing to its future progress. In this manner, AISC desires to parallel the development of prescriptive fire-resistive criteria for the concrete, masonry, and timber industries that are embodied in separate standards authored by the respective committees."

Bibliography: AISC (2022), *Specification for Structural Steel Buildings*, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.

Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal the application of a standard already adopted in the 2024 IBC.

FS85-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee determined that the proposed language reflects current structural steel industry standards. The committee agreed with updating the methodology for the calculation of fire resistance for structural steel assemblies to recognize the applicable portion of AISC 360-22's mandatory Appendix 4, Structural Design for Fire Conditions (specifically Appendix 4, Section 4.3) (Vote: 11-0).

FS85-24

Individual Consideration Agenda

Comment 1:

IBC: 722.1

Proponents: Bonnie Manley, AISC, AISC (manley@aisc.org); Richard Walke, Creative Technology Inc. and CM Services, National Fireproofing Contractors Association (richwalke61@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies and composite steel and concrete assemblies shall be permitted in accordance with AISC 360 Appendix 4, Section 4.3. **Exception:** Establishing equivalency to the standard fire-resistance rating using the advanced methods of analysis of AISC 360 Appendix 4.2 in combination with the fire exposure specified in ASTM E119 or UL 263 as the design-basis fire, as permitted in AISC 360 Appendix 4, Section 4.3.1, shall be in accordance with the requirements of Section 104.2.3
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: AISC 360-22, Appendix Section 4.3.1 permits the use of an advanced analysis procedure in accordance with Appendix Section 4.2.4c as an equivalent method when combined with the fire exposure specified in ASTM E119 or UL 263 as follows:

> **4.3.1. Qualification Standards**
>
> Structural members and components in steel buildings shall be qualified for the rating period in conformance with ASTM E119 or ANSI/UL 263. Demonstration of compliance with these requirements using the procedures specified for steel construction in Section 5 of Standard Calculation Methods for Structural Fire Protection (ASCE/SEI/SFPE 29) is permitted. **It is also permitted to demonstrate equivalency to such standard fire-resistance ratings using the advanced analysis methods in Section 4.2 in combination with the fire exposure specified in ASTM E119 or ANSI/UL 263 as the design-basis fire.**
>
> The generic steel assemblies described in Table A-4.3.1 shall be deemed to have the fire-resistance ratings prescribed therein.

The proposed exception clarifies that this method must follow the requirements of the alternate materials, design, and methods of construction and equipment as specified in IBC Section 104.2.3.

The need for this clarification was first identified in testimony by NFCA at the ICC CAH#1. AISC and NFCA have worked together to develop this comment addressing their concern. Additionally, work is now underway on the next edition of AISC 360 (2027). It is anticipated that this will be better clarified in that next edition and that this exception will be unneeded after the 2027 edition of the IBC.

Bibliography: AISC (2022), *Specification for Structural Steel Buildings*, ANSI/AISC 360-22, American Institute of Steel Construction, Chicago, Ill., August 1, 2022.
Available at: https://www.aisc.org/publications/steel-standards/.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal references a standard already adopted in the 2024 IBC.

Comment (CAH2)# 484

FS86-24

IBC: 722.1

Proposed Change as Submitted

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Steve Skalko, Stephen V. Skalko, P.E. & Associates LLC, Precast/Prestressed Concrete Institute (svskalko@svskalko-pe.com); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org); Nicholas Lang, Concrete Masonry & Hardscapes Association, Representing Masonry Alliance for Codes and Standards, Masonry Alliance for Codes & Standards (nlang@ncma.org)

2024 International Building Code

Revise as follows:

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.
5. Steel columns protected with concrete or masonry and hollow steel tubes filled with concrete shall be permitted in accordance with ACI/TMS 216.1

Reason: This code change proposal adds ACI/TMS 216.1 as a compliance path for structural steel columns protected with concrete or masonry and hollow structural steel columns filled with concrete. ACI/TMS 216.1 continues to provide the methods to provide fire protection for structural steel columns using concrete or masonry and fire resistance ratings for hollow steel columns filled with concrete. This adds an alternative to ASCE 29 as an additional resource for determining compliance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This changes does not increase cost as it provides an alternative compliance method to those already permitted in the code.

FS86-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal based on the approval of FS89-24 and as requested by the proponent (Vote: 10-0).

FS86-24

Individual Consideration Agenda

Comment 1:

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org) requests As Submitted

Reason: Approval as submitted based on original reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 380

FS87-24

IBC: 722.1

Proposed Change as Submitted

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Shamim Rashid-Sumar, National Ready Mixed Concrete Association, National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Building Code

Revise as follows:

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of specific materials or combinations of materials shall be established by one of the following:

1. *Concrete,*concrete *masonry* and clay*masonry* assemblies shall be permitted in accordance with ACI 216.1/TMS 0216.
2. Precast and precast, prestressed *concrete* assemblies shall be permitted in accordance with PCI 124 or ACI/TMS 216.1.
3. Steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29.
4. Exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AWC NDS.

Reason: This proposal clarifies that ACI/TMS 216.1 is a appropriate for determining the fire resistance ratings of precast, prestressed concrete assemblies. Item 1, does not distinguish between prestressed and non-prestressed assemblies and both are covered in ACI/TMS 216.1. By reading Item 2 as currently written implies that only compliance with PCI 124 is acceptable precast, prestressed concrete assemblies. Prior to the addition of PCI 124 to the IBC, the user was directed to ACI/TMS 216.1 for all concrete assemblies including precast, prestressed concrete. This change provides clarity that ACI/TMS 216.1 remains an appropriate compliance path for precast, prestressed concrete assemblies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No technical change, simply clarifies that ACI/TMS 216.1 remains applicable for precast, prestressed concrete, per Item 1

FS87-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal based on the approval of FS89-24 and as requested by the proponent (Vote: 10-0).

FS87-24

Individual Consideration Agenda

Comment 1:

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org) requests As Submitted

Reason: Stand on original reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 385

FS94-24

IBC: 803.13, TABLE 803.13

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

803.13 Interior finish requirements based on occupancy. *Interior wall and ceiling finish* shall have a classification such that the *flame spread index* and *smoke-developed index* values are not higher than those corresponding to the classification specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

Revise as follows:

TABLE 803.13 INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

	SPRINKLERED[l] S, S13R, S13D			NONSPRINKLERED - NS		
GROUP	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]
A-1 & A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M, R-1	B	C[lm]	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[h, i]	A	A	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, i]	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.15.1.

b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based on spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered to be enclosing spaces and the rooms or spaces on both sides shall be considered to be one room or space. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall be not less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

~~l. Applies when protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.~~

l ~~m~~. Corridors in ambulatory care facilities shall be provided with Class A or B materials.

Reason: The intent of this group of proposal is to make the tables in Chapter 8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirements. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system. Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states “Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.” However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivided by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that “Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.” To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

· adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.· Footnote l with the sprinkler reference is redundant and deleted.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

FS94-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee deemed the proposed code change clarifies the table requirements (Vote: 11-0).

FS94-24

Individual Consideration Agenda

Comment 1:

Proponents: Kevin Scott, KH Scott & Associates LLC, self (khscottassoc@gmail.com) requests Disapproved

Reason: This item was Approved at CAH 1, and the comment proposes to Disapprove this item in its entirety.

While I agree that in the room where a sprinkler is located, a sprinkler attached to a NFPA 13D system would be beneficial, that is not what this code change says. This code change says that if the building has an NFPA 13D sprinkler system, then any room in that building is considered sprinklered and therefore is given the benefit of reducing the flame spread rating. That is an incorrect application of this logic.

The logic should be applied in a manner that provides the room containing the sprinkler to realize the benefit of being sprinklered. The footnotes indicate that NS means the the building is not equipped throughout with a sprinkler system. It has already been established that the ICC interpretation is "sprinklered throughout" means sprinklers are located where they are required. In accordance with NFPA 13D there are many areas where sprinklers are not required, yet those "rooms and enclosed spaces" would now fall under the sprinklered category and benefit from the building being sprinklered.

The intent of this sprinkler benefit in this table is that the sprinkler is located in the room where the flame spread reduction is taken. Until those two items are correlated, this code change should not be approved.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 800

FS98-24

IBC: 1402.2, 1402.3 (New), [BS] 1402.3, FIGURE 1402.3 (New), TABLE 1402.3 (New)

Proposed Change as Submitted

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, myself (jcrandell@aresconsulting.biz); Art DeGaetano, Northeast Regional Climate Center, Cornell, self (atd2@cornell.edu)

2024 International Building Code

Revise as follows:

1402.2 Weather protection. Buildings shall be provided with a weather-resistant *exterior wall assembly* . The *exterior wall assembly* shall include flashing, as described in Section 1404.4. The *exterior wall assembly* shall be designed and constructed in such a manner as to prevent the accumulation of water within the exterior wall assembly by providing a *water-resistive barrier* behind the exterior *veneer*, as described in Section 1403.2, and a means for draining water that enters the assembly to the exterior. Where not otherwise addressed by the materials and methods for weather protection prescribed by this code, rainwater resistance shall be permitted to be demonstrated in accordance with Section 1402.3. Protection against condensation in the *exterior wall* assembly shall be provided in accordance with Section 1404.3. **Exceptions:**

1. A weather-resistant *exterior wall assembly* shall not be required over concrete or *masonry* walls designed in accordance with Chapters 19 and 21, respectively.
2. Compliance with the requirements for a means of drainage, and the requirements of Sections 1403.2 and 1404.4, shall not be required for an *exterior wall assembly* that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:
   The *exterior wall* design shall be considered to resist wind-driven rain where the results of testing, in accordance with ASTM E331, indicate that water did not penetrate control joints in the *exterior wall* , joints at the perimeter of openings or intersections of terminations with dissimilar materials.

   2.1. *Exterior wall* test assemblies shall include not fewer than one opening, one control joint, one wall/eave interface and one wall sill. Tested openings and penetrations shall be representative of the intended end-use configuration.

   2.2. *Exterior wall* test assemblies shall be not less than 4 feet by 8 feet (1219 mm by 2438 mm) in size.

   2.3. *Exterior wall* test assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (0.297 kN/m^2).

   2.4. *Exterior wall* test assemblies shall be subjected to a minimum test exposure duration of 2 hours.

3. *Exterior insulation and finish systems* (EIFS) complying with Section 1407.4.1.

Add new text as follows:

1402.3 Rainwater resistance.. The rainwater resistance of *exterior wall* assemblies, including the *exterior wall covering* assembly or only the *water-resistive barrier* system, shall be permitted to be tested in accordance with ASTM E331 to demonstrate compliance with the weather protection requirements of Section 1402.2. The following test conditions shall apply:

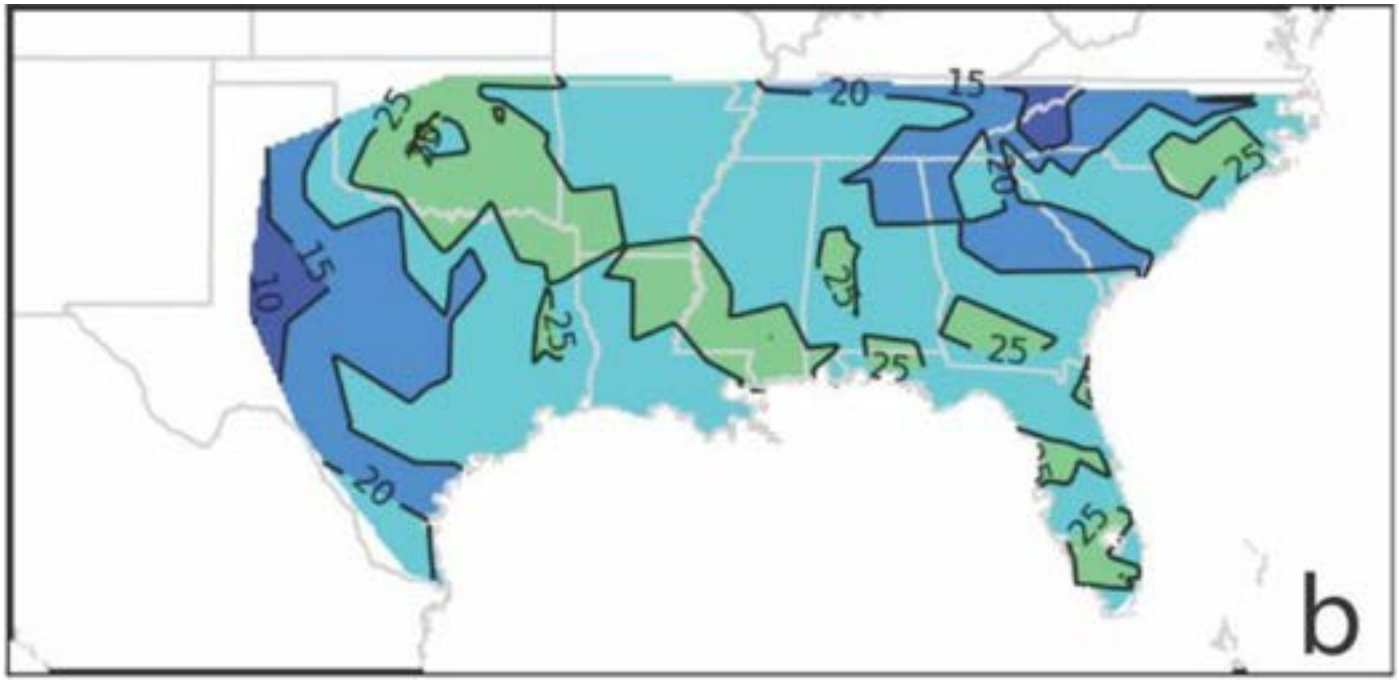
1. The ASTM E331 test pressure shall be determined in accordance with Table 1402.3 and Figure 1402.3 or by calculations in accordance with ASCE 7 using a design wind-driven rain wind speed in accordance with Figure 1402.3. The test pressure shall not be less than 2.86 psf (137 Pa) and shall not be required to exceed 12.0 psf (575 Pa).
2. The duration of test shall not be less than 15 minutes. Subsequent tests with increased test pressure shall be permitted with leakage assessment after each test.

3. The tested assembly shall be considered to resist wind-driven rain at the greatest test pressure increment where water did not penetrate the innermost layer intended to provide water resistance protection of the remainder of the wall assembly.
4. Test assemblies shall be constructed in accordance with the applicable manufacturer's installation instructions for each component and shall comply with the following minimum assembly configuration requirements:
   4.1. Not fewer than one opening element or blank, and flashing condition.
   4.2. Not fewer than one vertical and horizontal joint in the *water-resistive barrier* assembly where representative of installed conditions
   4.3. Where exterior *veneer* or cladding is included on the test assembly, it shall include not fewer than one control joint or transition joint as applicable and the results shall be limited to the type of *veneer* or cladding used.
   4.4. Test assemblies shall not be less than 4 feet by 8 feet (1.2 m by 2.4 m) in size.

Revise as follows:

[BS] 1402.4 ~~1402.3~~ Wind resistance. *Exterior walls*, exterior wall coverings, exterior soffits and fascias, and the associated openings, shall be designed and constructed to resist safely the superimposed *loads* required by Chapter 16.

Add new text as follows:



Source: Cornell University / NOAA - ***to be replaced with full U.S. map with smoothed wind speed contours and units of MPH instead of m/s.***

FIGURE 1402.3 Wind-driven rain wind speed (m/s) hazard map to determine ASTM E331 test pressure criteria [1 m/s = 2.24 mph]

TABLE 1402.3 Pre-calculated Wind-Driven Rain ASTM E331 Test Pressure (PSF)

Wind Exposure	Mean Roof Height (ft)	Wind-driven Rain Wind Speed, m/s (MPH)						
		10 (22.4)	15 (33.6)	20 (44.8)	25 (56.0)	30 (67.2)	35 (78.4)	40 (89.6)

B	15	2.86	2.86	3.46	5.40	7.78	10.6	12.0
	20	2.86	2.86	3.76	5.87	8.46	11.5	12.0
	25	2.86	2.86	4.00	6.25	9.00	12.0	12.0
	30	2.86	2.86	4.24	6.63	9.55	12.0	12.0
	40	2.86	2.86	4.61	7.20	10.4	12.0	12.0
	50	2.86	2.86	4.91	7.67	11.0	12.0	12.0
	60	2.86	2.90	5.15	8.05	11.6	12.0	12.0
C	15	2.86	2.90	5.15	8.05	11.6	12.0	12.0
	20	2.86	3.07	5.46	8.53	12.0	12.0	12.0
	25	2.86	3.21	5.70	8.90	12.0	12.0	12.0
	30	2.86	3.34	5.94	9.28	12.0	12.0	12.0
	40	2.86	3.55	6.31	9.85	12.0	12.0	12.0
	50	2.86	3.72	6.61	10.3	12.0	12.0	12.0
	60	2.86	3.85	6.85	10.7	12.0	12.0	12.0
D	15	2.86	3.51	6.24	9.8	12.0	12.0	12.0
	20	2.86	3.68	6.55	10.2	12.0	12.0	12.0
	25	2.86	3.82	6.79	10.6	12.0	12.0	12.0
	30	2.86	3.96	7.03	11.0	12.0	12.0	12.0
	40	2.86	4.16	7.40	11.6	12.0	12.0	12.0
	50	2.86	4.33	7.70	12.0	12.0	12.0	12.0
	60	2.86	4.47	7.94	12.0	12.0	12.0	12.0

For SI: 1 psf = 47.9 Pa

Reason: The code lacks a risk-consistent basis for addressing wind-driven rain and resistance to water intrusion. This proposal provides a wind-driven rain hazard map (Figure 1402.3) that properly characterizes the hazard as it varies across wind-driven rain climatology of the U.S. This map of the southeastern U.S. is a placeholder until a map of the entire U.S. becomes available in 2024.

The proposal “permits” and does not mandate use of proposed Section 1402.3, the wind-driven rain map of Figure 1402.3, or the associated ASTM E331 test pressures of Table 1402.3. Instead, the reference to Section 1402.3 in Section 1402.2 uses permissive language (“shall be permitted”) to allow for current practice to continue unchanged for existing materials and methods recognized in the code. This optional or voluntary approach will allow time for various stake-holders and standards developers to align their standards with this new risk-based approach without changing requirements for materials and methods currently recognized in the code at this time.

Various portions and details of this proposal are further explained below.

Figure 1402.3

– As reported in the Bibliography reference, the climatology of wind-driven rain is developed from recently available 1-min weather observations from National Weather Service Automated Surface Observing Systems (ASOS). One-minute data better represent the joint occurrence of the extremes that define wind-driven rain occurrence than hourly data, which previously was the shortest available temporal resolution. After adjusting the winds speeds to standardize for exposure and anemometer type, the wind data corresponding to

specific rainfall thresholds were fit to a statistical distribution to obtain estimates of the recurrence of wind speeds associated with different rainfall intensities. The values serve as the basis for a wind-driven rain climatology for the United States that is analogous to climatologies that exist and inform building codes in Europe and Canada. The wind-driven rain map shown in Figure 1402.3 is based on the currently completed research for the southeastern U.S. and represents a 3-sec gust wind speed (meters per second) for a 10-yr mean recurrence interval with a threshold coincidental rainfall rate of 2.54 mm/min (see JAMC article referenced in Bibliography). It is anticipated that research to complete a similar map for the entire U.S. (at an appropriate return period wind speed and threshold for coincidental rainfall rate) will be completed prior to the second committee hearing in 2024.

Section 1402.3 & Table 1402.3

– The test procedure and requirements used in proposed new Section 1402.3 rely on a standard test method commonly used for assessing wind-driven rain resistance, ASTM E331. While similar to testing requirements in Exception 2 of Section 1402.2, the application of Section 1402.3 is not limited to evaluation of “barrier claddings” that lack a means of drainage. The main purpose of the mapped wind-driven rain hazard (Figure 1402.3) is to provide a wind-driven rain wind speed from which an appropriate, risk-consistent test pressure can be used to evaluate the water-resistance of wall assemblies and exterior wall covering assemblies or components using ASTM E331. The test pressure may be determined in two ways. One way is to use the prescriptive (pre-calculated) test pressures in Table 1402.3. The other way is to calculate the test pressure using the ASCE 7 provisions for wind loads, but substituting the appropriate wind-driven rain wind speed from Figure 1402.3 for the basic wind speed used for structural design purposes in ASCE 7. The latter method was how Table 1402.3 was generated. An example of calculating the test pressure using Figure 1402.3 and the wind load provisions of ASCE 7 is as follows:

Wind-driven rain wind speed: 44.8 mph (20 m/s – Figure 1402.3)

Wind Exposure: B (suburban/wooded)

Building Height: 30 feet

Wall Pressure coefficients – GCp = 1.0 (positive); GCpi = -0.18 (negative internal pressure)

Kz = 0.7 (exposure B, 30’ height)

Kd = 1.0 (directionality not considered)

Kzt = 1.0 (no topographic wind speed up effects considered)

Ke = 1.0 (no elevation effects considered w/r to lower density of air at higher elevations)

$p = [0.00256\ Kz\ Kzt\ Kd\ Ke\ V^2] \times [GCp - GCpi]$

$= 0.00256(0.7)(1.0)(1.0)(1.0)(44.8)^2 \times [1.0 + 0.18]$

= (3.6 psf) x [1.18] = **4.24 psf** test pressure

The above calculation method was used to develop Table 1402.3 as shown also in the table below. This table is provided for transparency and informational purposes.

	Mean			WDR Wind Speed, m/s (MPH)							
Wind	Roof	10	15	20	25	30	35	40	45	50	60
Exposure	Height (ft)	22.4	33.6	44.8	56	67.2	78.4	89.6	100.8	112	134.4
	15	0.86	1.94	3.46	5.40	7.78	10.58	13.82	17.50	21.60	31.10
	20	0.94	2.11	3.76	5.87	8.46	11.51	15.04	19.03	23.49	33.83
	25	1.00	2.25	4.00	6.25	9.00	12.25	16.01	20.26	25.01	36.01
B	30	1.06	2.39	4.24	6.63	9.55	13.00	16.98	21.49	26.53	38.20
	40	1.15	2.59	4.61	7.20	10.37	14.11	18.43	23.33	28.80	41.47
	50	1.23	2.76	4.91	7.67	11.05	15.04	19.64	24.86	30.69	44.20
	60	1.29	2.90	5.15	8.05	11.60	15.78	20.61	26.09	32.21	46.38
	15	1.29	2.90	5.15	8.05	11.60	15.78	20.61	26.09	32.21	46.38
	20	1.36	3.07	5.46	8.53	12.28	16.71	21.83	27.62	34.10	49.11
	25	1.42	3.21	5.70	8.90	12.82	17.45	22.80	28.85	35.62	51.29
C	30	1.49	3.34	5.94	9.28	13.37	18.20	23.77	30.08	37.14	53.47
	40	1.58	3.55	6.31	9.85	14.19	19.31	25.22	31.92	39.41	56.75
	50	1.65	3.72	6.61	10.33	14.87	20.24	26.43	33.46	41.30	59.48
	60	1.71	3.85	6.85	10.70	15.41	20.98	27.40	34.68	42.82	61.66
	15	1.56	3.51	6.24	9.76	14.05	19.12	24.98	31.61	39.03	56.20
	20	1.64	3.68	6.55	10.23	14.73	20.05	26.19	33.15	40.92	58.93
	25	1.70	3.82	6.79	10.61	15.28	20.80	27.16	34.38	42.44	61.11
D	30	1.76	3.96	7.03	10.99	15.82	21.54	28.13	35.60	43.96	63.30
	40	1.85	4.16	7.40	11.56	16.64	22.65	29.59	37.45	46.23	66.57
	50	1.92	4.33	7.70	12.03	17.32	23.58	30.80	38.98	48.12	69.30
	60	1.99	4.47	7.94	12.41	17.87	24.32	31.77	40.21	49.64	71.48

It is important to note that the failure mode that this proposal addresses is the initiation of a leak (water intrusion) at a specified extreme event level. Therefore, it provides protection for routine and lesser extreme events that have equal or lower wind-driven rain wind speed (even if the rainfall rate is substantially greater than the threshold used to develop Figure 1402.3). Events that exceed the wind-driven rain wind speed and given recurrence interval (return period or annual extreme probability) tend to have lower coincidental rainfall rates as based on the natural tendency in the climatological data (see JAMC article referenced in Bibliography).

Finally, as indicated in Section 1402.3 (Item 1) and shown in Table 1402.3, the lower limit of 2.86 psf (137 Pa) for test pressure is used to correspond with the minimum test pressure specified in ASTM E331 (despite the table above showing that lower pressure could be justified in regions of low wind-driven rain hazard). The upper limit of 12.0 psf (575 Pa) in Table 1402.3 also is based on current accepted practice for worst-case wind-driven rain climate conditions in the U.S. and ensures the availability of solutions (it also ensures equivalency with current accepted practices for regions or conditions considered to have high wind-driven rain hazard). These limits ensure that this new approach is “calibrated” to accepted practice and that solutions are available while also better aligning solutions with actual variation in U.S. wind-driven rain hazard. Even so, the 12 psf cap will provide substantial protection against significant water-intrusion and contents damage in greater wind-driven rain hazard conditions or events (higher wind speed at greater return periods) up to the point where structural failures begin to occur and the general integrity of the building envelope is compromised. Such extreme structural safety-level events are beyond the scope of a serviceability concern underlying the current and proposed approach to water resistance. Regardless, the proposed approach deals with the matter of wind-driven rain water resistance in a much more risk-consistent fashion based on the variation in hazard across the U.S. (wind-driven rain wind speed) and for different building conditions (e.g., wind exposure and building height).

Bibliography: Belcher, B.N., DeGaetano, A.T., Masters, F.J., Crandell, J., and Morrison, M.J. (2023). Development of an Extreme Wind-Driven Rain Climatology for the Southeastern United States Using 1-Min Rainfall and Peak Wind Speed Data. *Journal of Applied Meteorology and Climatology*, American Meteorological Society, DOI: https://doi.org/10.1175/JAMC-D-22-0156.1

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.00

While the cost impact indicates “increased cost” (there was no suitable default answer in cdpACCESS), the proposal does not mandate any new requirements. It provides a new means or option to evaluate building wall assemblies and components for water resistance using an improved methodology based on actual wind-driven rain hazard. If voluntarily used, it could result in an increase or decrease cost for material or assembly qualification purposes relative to existing practices. But, the increase or decrease in cost to the end user may be very small. This proposal also does not require any existing materials or methods recognized in the code to alter current

requirements, methods, or standards. So, it should be considered cost neutral.

Estimated Immediate Cost Impact Justification (methodology and variables):

Zero

Estimated Life Cycle Cost Impact:

Zero

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See cost impact statement.

FS98-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as requested by the proponent to work on the proposal for the CAH2 (Vote: 12-0).

FS98-24

Individual Consideration Agenda

Comment 1:

IBC: 1402.3

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, myself (jcrandell@aresconsulting.biz) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1402.3 Rainwater resistance.. The rainwater resistance of *exterior wall* assemblies, including the *exterior wall covering* assembly or only the *water-resistive barrier* system, shall be permitted to be tested in accordance with ASTM E331 to demonstrate compliance with the weather protection requirements of Section 1402.2. The following test conditions shall apply:

1. The ASTM E331 test pressure shall be determined in accordance with Table 1402.3 and Figure 1402.3 or by calculations in accordance with ASCE 7 using a design wind-driven rain wind speed in accordance with Figure 1402.3 or an *approved source*. The test pressure shall not be less than 2.86 psf (137 Pa) and shall not be required to exceed 12.0 psf (575 Pa).
2. The duration of test shall not be less than 15 minutes. Subsequent tests with increased test pressure shall be permitted with leakage assessment after each test.
3. The tested assembly shall be considered to resist wind-driven rain at the greatest test pressure increment where water did not penetrate the innermost layer intended to provide water resistance protection of the remainder of the wall assembly.

4. Test assemblies shall be constructed in accordance with the applicable manufacturer's installation instructions for each component and shall comply with the following minimum assembly configuration requirements:
    4.1. Not fewer than one opening element or blank, and flashing condition.
    4.2. Not fewer than one vertical and horizontal joint in the *water-resistive barrier* assembly where representative of installed conditions
    4.3. Where exterior *veneer* or cladding is included on the test assembly, it shall include not fewer than one control joint or transition joint as applicable and the results shall be limited to the type of *veneer* or cladding used.
    4.4. Test assemblies shall not be less than 4 feet by 8 feet (1.2 m by 2.4 m) in size.

Reason: This proposal was disapproved at CAH#1 at the request of the proponent to allow time for additional work on the wind-drive rain map (Figure 1402.3) to be completed. This modified proposal provides flexibility to use an "approved source" in lieu of the mapped wind-driven rain wind speeds of proposed Figure 1402.3 given its limited scope of the southeastern U.S. Otherwise the proposal is unchanged. The intent remains to replace the southeastern US map in Figure 1402.3 with a full US map, but the NOAA-funded research at Cornell University was not completed in time for this comment submission. Therefore, the map replacement may occur as a modification during CAH#2. If not, it will be addressed during the public comment phase.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed modification to FS98-24 only adds the option to use an "approved source" as an alternative to the mapped wind-driven rain wind speed data. This is editorial in nature and has no cost impact. For the overall proposal's cost impact, refer to the originally submitted proposal cost impact statement which remains applicable. The overall proposal is considered to be "cost neutral" because it is providing an option, not a new requirement that changes any existing requirements.

Comment (CAH2)# 364

FS101-24

IBC: 1402.5, 1402.5.1, 1402.5.2, 1402.5.3, 1402.5.4, 1402.5.5, 1402.5.6 (New)

Proposed Change as Submitted

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (holtweston88@gmail.com)

2024 International Building Code

Revise as follows:

1402.5 Vertical and lateral flame propagation. *Exterior walls* on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with Sections 1402.5.1 through ~~1402.5.5~~ 1402.5.6, as applicable. Where compliance with NFPA 285 and associated acceptance criteria is required in Sections 1402.5.1 through ~~1402.5.5~~ 1402.5.6, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.

1402.5.1 Combustible water-resistive barrier. *Exterior walls* containing a combustible *water-resistive barrier* shall comply with Section 1402.6.

1402.5.2 Metal composite material (MCM) . *Exterior walls* containing metal composite material (MCM) systems shall comply with Section 1406.

1402.5.3 Exterior insulation and finish system (EIFS) . *Exterior walls* containing an exterior insulation and finish system (EIFS) shall comply with Section 1407.

1402.5.4 High-pressure decorative exterior-grade compact laminate (HPL) system . *Exterior walls* containing a high-pressure decorative exterior-grade compact laminate (HPL) system shall comply with Section 1408.

1402.5.5 Foam plastic insulation. *Exterior walls* containing *foam plastic insulation* shall comply with Section 2603.

Add new text as follows:

1402.5.6 Fiber-Reinforced Polymer. *Exterior Walls* containing *fiber-reinforced polymer* shall comply with Section 2613.

Reason: This proposal completes the list of pointers added in the last code change cycle. Section 2613.5 contains requirements for fiber-reinforced polymer materials used in exterior walls and further links to NFPA285 testing requirements. The inclusion of pointers was accepted in the last cycle as it "assists users of the Code by providing reference to all the relevant sections of Chapter 14 and Chapter 26 containing specific requirements for exterior wall assemblies needing testing to NFPA 285" (as stated in the 2021 Report of the Committee Action Hearings on the 2021 Editions of the Group A International Codes" Item FS122-21). This proposal has the same purpose of assisting users of the Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not change requirements but only provides a pointer to existing requirements to aid the user of the code.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee deemed that the proposed code change is necessary to clarify the technical requirements. The committee also indicated that the proposal is a good first step (Vote: 10-2).

FS101-24

Individual Consideration Agenda

Comment 1:

IBC: 1402.5.6

Proponents: Stephen Szoke, American Concrete Institute, American Concrete Institute (steve.szoke@concrete.org); Stephen Skalko, Stephen V. Skalko, P.E. & Associates LLC, Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1402.5.6 Fiber-Reinforced Polymer. Exterior Walls containing fiber-reinforced polymer shall comply with Section 2613.

Exception: Exterior walls where the only FRP is fiber reinforced polymer reinforcing bars embedded in concrete in accordance with Section 1901.2.1 or masonry in accordance with Section 2101.2.

Reason: Exempts testing of concrete and masonry internally reinforced with FRP reinforcing bars. This modification clarifies the intent of the current code provisions provided for concrete or masonry cover in Section 2603.5.7 and 20% aggregate area exception in Section 2613.5. The revised language simplifies code compliance without directing the user to seek out exceptions and interpret criteria in multiple sections of Chapter 26.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifies code and simplifies compliance by placing exemption in initial charging language.

Comment (CAH2)# 393

FS103-24

IBC: 1402.6

Proposed Change as Submitted

Proponents: David Bueche, Hoover Treated Wood Products (dbueche@frtw.com)

2024 International Building Code

Revise as follows:

1402.6 Water-resistive barriers. *Exterior walls* on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*. **Exceptions:**

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.
3. Walls constructed of *fire-retardant-treated wood* complying with Section 2303.2 and tested in accordance with and comply with the acceptance criteria of NFPA 285, and the *water-resistive barrier* complies with either Exception 1 or Exception 2.

Reason: Building cladding fires, such as the Grenfell Tower fire in London, UK, have prompted review of the application of the NFPA 285 test standard to identify potential existing conflicts and areas of needed improvement or clarification. Section 1402.5 appears to create a conflict resulting in significant industry confusion regarding the use of fire-retardant-treated wood (FRTW) in Types I, II, III, & IV construction as allowed by Section 602 and 603. This section suggests that FRTW cannot be used with a NFPA 285-compliant water-resistive barrier beyond 40 feet in height. The code currently allows FRTW used in Type III construction to extend to 85 feet in height. As FRTW does not meet the definition of “noncombustible” per Section 703.5, exceptions 1 and 2 cannot be applied. This change provides for the needed clarification to permit FRTW to be used as permitted in Section 602 and 603 in conjunction with a NFPA 285 compliant water-resistive barrier.

One of the arguments from the last code cycle was that the industry wanted this exception because they cannot pass NFPA 285. However, recent tests have resulted in a UL exterior wall system (UL-EWS0045) for an FRTW lumber and plywood assembly with two weather-resistive barrier options demonstrating compliance with NFPA 285.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

There is a potential for construction savings where FRTW use was denied due to existence of a combustible water-resistive barrier.

A cost decrease of $27.46 per square foot is possible in an R-2 Occupancy if Type IIIA Construction can be used in lieu of Type IIA Construction. See the August 2023 ICC Building Valuation Data where an R-2 Occupancy of Type IIIA Construction has a square foot construction cost $175.96 and an R-2 Occupancy of Type IIA Construction has a square foot construction cost of $203.42.

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Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

FS103-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as requested by the proponent to work on the proposal for the CAH2 (Vote: 11-0).

FS103-24

Individual Consideration Agenda

Comment 1:

IBC: 1402.6

Proponents: David Bueche, Hoover Treated Wood Products, Hoover Treated Wood Products (dbueche@frtw.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1402.6 Water-resistive barriers. *Exterior walls* on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*. **Exceptions:**

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco or steel with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.
3. Exterior ~~Walls~~ walls constructed of *fire-retardant-treated wood* complying with Section 2303.2 and which have been tested ~~in accordance~~ with and comply with the acceptance criteria of NFPA 285~~,~~ and the *water-resistive barrier* complies with ~~either~~ the ~~Exception 1 or~~ Exception 2 criteria.

Reason: This comment addresses concerns the water-resistive barrier industry had with the original proposal.

Building cladding fires, such as the Grenfell Tower fire in London, UK, have prompted review of the application of the NFPA 285 test standard to identify potential existing conflicts and areas of needed improvement or clarification. Section 1402.5 appears to create a conflict resulting in significant industry confusion regarding the use of fire-retardant-treated wood (FRTW) in Types I, II, III, & IV construction as allowed by Section 602 and 603. This section suggests that FRTW cannot be used with a NFPA 285-compliant water-resistive barrier beyond 40 feet in height. The code currently allows FRTW used in Type III construction to extend to 85 feet in height. As FRTW does not meet the definition of “noncombustible” per Section 703.5, exceptions 1 and 2 cannot be applied. This change provides for the needed clarification to permit FRTW to be used as permitted in Section 602 and 603 in conjunction with a NFPA 285 compliant water-resistive barrier.

One of the arguments from the last code cycle was that the industry wanted this exception because they cannot pass NFPA 285. However, recent tests have resulted in a UL exterior wall system (UL-EWS0045) for an FRTW lumber and plywood assembly with two water-resistive barrier options demonstrating compliance with NFPA 285.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

There is a potential for construction savings where FRTW use was denied due to existence of a combustible water-resistive barrier. A cost decrease of $27.46 per square foot is possible in an R-2 Occupancy if Type IIIA Construction can be used in lieu of Type IIA Construction. See the August 2023 ICC Building Valuation Data where an R-2 Occupancy of Type IIIA Construction has a square foot construction cost $175.96 and an R-2 Occupancy of Type IIA Construction has a square foot construction cost of $203.42.

Estimated Immediate Cost Impact Justification (methodology and variables):

Fire-retardant-treated wood is generally less expensive than noncombustible materials. Because FRTW may be used as an alternate to these materials, the cost may be less.

Comment (CAH2)# 621

FS104-24

IBC: 1402.6, 2603.5.7

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Building Code

Revise as follows:

1402.6 Water-resistive barriers. *Exterior walls* on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*. **Exceptions:**

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has an *exterior wall* covering of brick, concrete, stone, terra cotta, stucco, ~~or~~ steel or fiber-cement with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

2603.5.7 Ignition. *Exterior walls* shall not exhibit sustained flaming where tested in accordance with NFPA 268. Where a material is intended to be installed in more than one thickness, tests of the minimum and maximum thickness intended for use shall be performed.

Exception: Assemblies protected on the outside with one of the following:

1. A thermal barrier complying with Section 2603.4.
2. A minimum 1-inch (25 mm) thickness of concrete or *masonry*.
3. Glass-fiber-reinforced concrete panels of a minimum thickness of $^3/_8$ inch (9.5 mm).
4. Metal-faced panels having minimum 0.019-inch-thick (0.48 mm) aluminum or 0.016-inch-thick (0.41 mm) corrosion-resistant steel outer facings.
5. A minimum $^7/_8$-inch (22.2 mm) thickness of stucco complying with Section 2510.
6. A minimum $^1/_4$-inch (6.4 mm) thickness of *fiber-cement* lap, panel or shingle siding complying with Section 1404.17 and Section 1404.17.1 or 1404.17.2.

Reason: This change proposal is editorial in nature, and harmonizes materials listed in section 1402.6 with those listed in 2603.5.7

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides harmonization of materials listed as exceptions. No additional requirements are being added.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as requested by the proponent to work on the proposal for the CAH2 (Vote: 12-0).

FS104-24

Individual Consideration Agenda

Comment 1:

IBC: 1402.6

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1402.6 Water-resistive barriers. *Exterior walls* on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above *grade plane* and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.Combustibility shall be determined in accordance with Section 703.3. For the purposes of this section, *fenestration* products, flashing of *fenestration* products and *water-resistive-barrier* flashing and accessories at other locations, including through wall flashings, shall not be considered part of the *water-resistive barrier*. **Exceptions:**

1. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *exterior wall* has ~~a~~n noncombustible *exterior wall* covering of brick, concrete, stone, terra cotta, stucco, steel or fiber-cement with minimum thicknesses in accordance with Table 1404.2.
2. *Exterior walls* in which the *water-resistive barrier* is the only combustible component and the *water-resistive barrier* complies with the following:
   2.1 A peak heat release rate of less than 150 kW/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg when tested on specimens at the thickness intended for use, in accordance with ASTM E1354, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m^2.
   2.2 A *flame spread* index of 25 or less and a *smoke-developed index* of 450 or less as determined in accordance with ASTM E84 or UL 723, with test specimen preparation and mounting in accordance with ASTM E2404.

Reason: During CAH1, this proposal was requested to be disapproved due to concerns from stakeholders prior to the hearing regarding the noncombustibility of materials listed within.

This clarification to the original proposal is the result of working with with various stakeholders, and clarifies that all materials listed must be noncombustible; addressing concerns that not all materials listed in all forms necessarily passes ASTM E136 criteria using methods E136 or E2652 due to potential addition of organic / combustible ingredients such as foaming agents or fibers which would result in a

failed test.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is clarifying in nature and will not result in cost impacts.

Comment (CAH2)# 357

FS108-24

IBC: 1403.2, 1403.2.1 (New), 1705.21 (New)

Proposed Change as Submitted

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2024 International Building Code

1403.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* material shall be attached to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall *veneer*. The intersection between the *water-resistive barrier* material and fenestration openings shall be flashed and assembled in accordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and *building* appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2.
Water-resistive barriers shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type I or II.
3. Foam plastic insulating sheathing *water-resistive barrier* systems complying with Section 1402.2 and installed in accordance with manufacturer's installation instructions.
4. ASTM E331 in accordance with Section 1402.2.
5. Other *approved* materials installed in accordance with the manufacturer's installation instructions.

No. 15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, the upper and lower layer shall be lapped not less than 6 inches (152 mm).

Add new text as follows:

1403.2.1 Special inspections. The installation of the *water-resistive barrier* shall comply with the provisions of Sections 1704.2 and 1705.21.

1705.21 Water-resistive barrier Installation. *Special inspections* shall be required for the installation of the *water-resistive barrier* and the intersection of the *water-resistive barrier* with flashing in accordance with Sections 1403.2.

Reason: It is estimated that 70% of construction claims are due to water and moisture issues in the enclosure. [2,5] According to a recent report on building enclosure damage, "Water intrusion... .dreaded by homeowners, contractors, and insurance adjusters alike. It is evident why, as it ranks as the second most common cause for property insurance claims and first for the most expensive type of claim. In addition, water intrusion accounts for 70% of construction litigation. On average, each incident costs $11,098; collectively, water intrusion costs over $20 billion annually throughout the United States.[6] Furthermore, data suggests these water intrusion issues are a result of incorrect installation:

- A survey of "top 100" general contracting firms found the "53% of all defects of defects originate from poor workmanship, supervision and inspection of trade contractors during construction." [2]
- A third party quality assurance inspection firm lists several defects in water-resistive barrier and flashing integration among the "top 10 construction defects observed across the U.S. in 2018." [3]

This proposal seeks to reduce water intrusion issues resulting from incorrect installation of the water-resistive barrier and/or integration of flashings with the water-resistive barrier through requiring a special inspection of water-resistive barrier installation.

It should be noted that EIFS and EIFS water-resistive barriers already are subject to special inspections.

Bibliography:

1. ABAA, Air Barrier Quality Assurance Program, https://www.airbarrier.org/qap-overview/
2. Grosskopf, K. R. and D. E. Lucas, "Identifying the Causes of Moisture-Related Defect Litigation in U. S. Building Construction", COBRA 2008 – The Construction and Building Research Conference of the Royal Institution of Chartered Surveyors, Dublin, Sept 4-5, 2008
3. Hoch, Jeff, "The Top 10 Construction Defects Observed Across the U.S. in 2018, QualityBuilt, March 12, 2019; https://www.qualitybuilt.com/resources/top-10-construction-defects-2018/
4. Report of the Barrett Commission of Inquiry into the Quality of Condominium Construction in British Columbia, Vancouver BC, 1998.
5. Stroik, Brian, "Mock-ups: The Crash Test Dummy for Building Enclosures'" ABAA Conference, Norfolk, VA, March 26-27 2019. https://www.abaaconference.com/wp-content/uploads/2019/04/Mock-Ups-The-Crash-Test-Dummy-for-Building-Enclosures-Brian-Stroik.pdf
6. Swart, Amelia, "Damage Report: Water Intrusion", Forum Forensics, September 20, 2022, https://www.forumforensics.com/blog/damage-report-water-intrusion

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$.20 to .40 per square foot of opaque wall area.

Estimated Immediate Cost Impact Justification (methodology and variables):

This estimate was based on the cost of quality audits reported by the Air Barrier Association of America [1] and is likely a high estimate as an air barrier quality audit would cover more items than a special inspection of the water-resistive barrier and flashing alone. The increased immediate cost needs to be weighed against the liability for potential water intrusion damage if the water-resistive barrier and flashing are not installed correctly. Experience has shown that because of the relative inaccessibility of the water management components in the building enclosures, rebuilding a wall system can cost twice as much as the original wall cost per sq. ft. [4]

FS108-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee deemed that the proposed code change is needed but the language needs to be developed. The committee indicated that inspection and installation need to be addressed in detail (Vote: 9-3).

FS108-24

Individual Consideration Agenda

Comment 1:

IBC: 1403.2.1, TABLE 1403.2 (New), 1705.21

Proponents: Theresa Weston, The Holt Weston Consultancy, Air Barrier Association of America (ABAA) (holtweston88@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1403.2.1 Special inspections. Not less than one *special inspection* shall be required for the installation of the water-resistive barrier and the intersection of the water-resistive barrier with flashing in accordance with Table 1403.2.The *special inspection* of the installation of the *water-resistive barrier* shall comply with the provisions of Sections 1704.2 and 1705.21. A statement of special inspections shall be included in the construction documents in accordance with Section 107.1 and shall include the proposed inspection schedule, the list of inspection items, and inspection documentation to provided.The periodic inspection shall be conducted during construction while the water-resistive barrier is still accessible for inspection and repair.

Add new text as follows:

TABLE 1403.2 REQUIRED SPECIAL INSPECTIONS FOR *WATER-RESISTIVE BARRIER* INSTALLATION

***WATER-RESISTIVE BARRIER* TYPE**		**INSPECTION ITEM**
All *water-resistive barriers*		Verify the *water-resistive barrier* is continuous to the top of walls.
		Verify the *water-resistive barrier* is integrated with flashing installed at wall and roof intersections as described in section 1503.2
		Verify the *water-resistive barrier* is terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section 1402.2 and is integrated with flashings in accordance with Section 1404.4
Applicable to specific types of *water-resistive barriers.*	No 15 felt, and *water-resistive barriers* complying with ASTM E2556	Verify the *water-resistive barrier* is applied shingle fashion with the upper layer lapped over the lower layer not less than 2 inches (51 mm).
		Verify vertical joints in the *water-resistive barrier* sheets are lapped not less than 6 inches (152 mm)
	Foam plastic insulating sheathing *water-resistive barriers* systems	Verify installation in accordance with manufacturer's installation instructions.
	Water-resistive barrier approved through ASTM E331 testing in accordance with Section 1402.2	Verify installation is in accordance with the installation specified in the testing report.
	Water-resistive barriers approved as alternative materials	Verify the *water-resistive barrier* is installed in accordance with the manufacturer's installation instructions.

1705.21 Water-resistive barrier Installation. *Special inspections* shall be required for the installation of the *water-resistive barrier* and the intersection of the *water-resistive barrier* with flashing in accordance with Section~~s 1403.2~~ 1403.2.1.

Reason: In the reason statement of disapproval of this proposal at the 1st Committee Hearing "the committee deemed code change is needed but the language needs to be developed". This comment provides modifications which develop the language relating to the inspection and installation needs. This comment also addresses questions which were raised during the testimony at the committee hearings.

To address **who** will perform the special inspections. Section 1704.2, referenced in both the original and modified proposals, contains the qualifications for the special inspector. It states "the *approved agencies* shall provide written documentation to the *building official* demonstrating competence and relevant experience or training of the *special inspectors* who will perform the *special inspections* and tests during constructions." It also states "The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as an *approved agency* and their personnel are permitted to act as *special inspectors* for the work designed by them, provided they qualify as *special inspectors*." In many cases, staff already engaged in oversight of the construction project will be eligible to conduct the *special inspection*. Another option would be to engage the services of a third party to conduct the special inspection. If the third party route was chosen there are several talent pools from which to draw, including:

- IIBEC: Which has 2200 + credentialed members, including a specific credential for Registered Exterior Wall Observer (https://iibec.org/credentials/)
- ABAA QAP Certified Auditors: Available across the US with providers located in 2/3 of the states (https://www.airbarrier.org/qap/)
- RESNET HERS Raters: There are 6203 active HERS raters active across America (https://www.resnet.us/raters/) and HERS raters are eligible for a joint IECC/HERS Compliance Specialist Designation (https://www.iccsafe.org/content/ecs-designation/)
- Finally there are over 10,579 Home Inspectors in US (https://www.zippia.com/home-inspector-jobs/demographics/), many of whom would have the ability to conduct *water-resistive barrier* installation inspection.

There are sufficient trained professionals available to conduct the proposed special inspections.

To address **how** the *special inspections* would be conducted. Modifications to the proposal in this comment provide more detail on the *special inspection* process. This process is based on existing code requirements and is consistent with other required *special inspections*. The process involves:

- The inclusion of the *water-resistive barrier* installation in the statement of *special inspection* in the construction documents as required in Section 107.1.The statement will include the proposed inspection schedule, the list of inspection items and inspection documentation.
- At least one periodic special inspection of the *water-resistive barrier* installation is required. The number of inspections would be dependent on the size and complexity of the building.
- The periodic inspection is conducted while the *water-resistive barrier* is accessible.

To address **what** characteristics of installation will be inspected. The modified proposal contains a table of inspection items which are based on the requirements in Sections 1403.2 and a survey of common errors in *water-resistive barrier* installation based on industry audit information, interviews with industry professionals, and internet searches.[2, 5, 7] The table aligns with requirements based on requirements for specific types of *water-resistive barriers* 1403.2.

The reason **why** this proposal, now modified, is needed was provided in the original proposal, but is repeated here for the reader's convenience:

It is estimated that 70% of construction claims are due to water and moisture issues in the enclosure. [3,8] According to a recent report on building enclosure damage, "Water intrusion... .dreaded by homeowners, contractors, and insurance adjusters alike. It is evident why, as it ranks as the second most common cause for property insurance claims and first for the most expensive type of claim. In addition, water intrusion accounts for 70% of construction litigation. On average, each incident costs $11,098; collectively, water intrusion costs over $20 billion annually throughout the United States.[9] Furthermore, data suggests these water intrusion issues are a result of incorrect installation:

- A survey of "top 100" general contracting firms found the "53% of all defects of defects originate from poor workmanship, supervision and inspection of trade contractors during construction." [3]
- A third party quality assurance inspection firm lists several defects in water-resistive barrier and flashing integration among the "top 10 construction defects observed across the U.S. in 2018." [4]

This proposal seeks to reduce water intrusion issues resulting from incorrect installation of the water-resistive barrier and/or integration of flashings with the water-resistive barrier through requiring a special inspection of water-resistive barrier installation.
It should be noted that EIFS and EIFS water-resistive barriers already are subject to special inspections.

Bibliography:

1. ABAA, Air Barrier Quality Assurance Program, https://www.airbarrier.org/qap-overview/
2. Easley, Steve, "Housewrap Errors", Residential Design, 2022; https://residentialdesignmagazine.com/housewrap-errors-2/
3. Grosskopf, K. R. and D. E. Lucas, “Identifying the Causes of Moisture-Related Defect Litigation in U. S. Building Construction”,COBRA 2008 – The Construction and Building Research Conference of the Royal Institution of Chartered Surveyors, Dublin, Sept4-5, 2008
4. Hoch, Jeff, “The Top 10 Construction Defects Observed Across the U.S. in 2018, QualityBuilt, March 12, 2019;https://www.qualitybuilt.com/resources/top-10-construction-defects-2018/
5. Quality Built Tech Alerts; https://www.qualitybuilt.com/resources/category/tech-alert/
6. Report of the Barrett Commission of Inquiry into the Quality of Condominium Construction in British Columbia, Vancouver BC, 1998.
7. Schaack, Karl, "Potential Issues Encountered During Installation of Air and Weather-Resistive Barriers, International Institute of Building Enclosure Consultants (IIBEC), 2020; https://iibec.org/issues-encountered-with-barriers/
8. Stroik, Brian, “Mock-ups: The Crash Test Dummy for Building Enclosures’” ABAA Conference, Norfolk, VA, March 26-27 2019.https://www.abaaconference.com/wp-content/uploads/2019/04/Mock-Ups-The-Crash-Test-Dummy-for-Building-Enclosures-Brian-Stroik.pdf
9. Swart, Amelia, “Damage Report: Water Intrusion”, Forum Forensics, September 20, 2022,

https://www.forumforensics.com/blog/damage-report-water-intrusion

Cost Impact: Increase

Estimated Immediate Cost Impact:

As stated in the original proposal, $.20 to .40 per square foot of opaque wall area is likely a high estimate.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above estimate was based on the cost of quality audits reported by the Air Barrier Association of America [1] and is likely a high estimate as
an air barrier quality audit would cover more items than a special inspection of the water-resistive barrier and flashing alone. The increased immediate cost needs to be weighed against the liability for potential water intrusion damage if the water-resistive barrier and flashing are not installed correctly. Experience has shown that because of the relative inaccessibility of the water management components in the building enclosures, rebuilding a wall system can cost twice as much as the original wall cost per sq. ft. [6]

Comment (CAH2)# 366

FS112-24

IBC: 1403.15 (New), 1404.19 (New), 1404.19.1 (New), 1404.19.2 (New), 2605.4 (New), ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Building Code

Add new text as follows:

1403.15 Plastic lumber or wood-plastic composite exterior wall covering materials. Where plastic lumber materials and wood-plastic composite materials are used as exterior wall coverings, such materials shall be *listed* and labeled in accordance with ASTM D8484 and shall be installed in accordance with the requirements of Section 1404.19 and the manufacturer's instructions. The materials shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1404.19 Plastic lumber or wood-plastic composite exterior wall covering materials. Plastic lumber materials and wood-plastic composite materials used as exterior wall coverings shall comply with this section and Section 1403.15.

1404.19.1 Design wind pressure 30 pounds per square foot or less. Plastic lumber and wood-plastic composite exterior wall coverings materials shall be limited to exterior walls located in areas where the design wind pressure determined in Section 1609 speed does not exceed 30 pounds per square foot (1.44 kN/m^2) except as provided for in 1404.19.2.

1404.19.2 Design wind pressure greater than 30 pounds per square foot. Where the design wind pressured determined in Section 1609 exceeds 30 pounds per square foot (1.44 kN/m^2), tests or calculations indicating compliance with Chapter 16 shall be submitted.

2605.4 Plastic lumber or wood-plastic composite exterior wall covering materials. Plastic lumber materials or wood-plastic composite materials used as exterior wall covering shall comply with Sections 1403 and 1404.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D8484-23	Standard Specification for Plastic Lumber Materials and Wood-Plastic Composite Materials Used as Exterior Wall Coverings

Reason: The IBC code includes requirements for a variety of materials that are used as exterior wall coverings, meaning as components of exterior wall assemblies. They include some plastic siding materials, such as vinyl siding and polypropylene siding. The code also includes requirements for the use of plastic composite materials (which are defined in the IBC as "A generic designation that refers to wood/plastic composites, plastic lumber and similar materials.") in "exterior deck boards, stair treads, handrails and guards" (section 1409), with the requirements shown in section 2612.

In recent years some plastic lumber materials and/or wood-plastic composite materials have been used as components of exterior wall assemblies. However, neither section 1403 (Materials) nor section 1404 (Installation of wall coverings) nor section 1405 (Combustible materials on the exterior side of exterior walls) discuss the requirements for plastic lumber materials or wood-plastic composite materials when used as exterior wall coverings, and clearly there needs to be a difference between the use of materials as deck boards (horizontally) and as exterior wall coverings (vertically).

ASTM has recently developed a specification (ASTM D8484, Standard Specification for Plastic Lumber Materials and Wood-Plastic Composite Materials Used as Exterior Wall Coverings) that contains all the appropriate requirements. The properties contained in ASTM D8484 include the following: conditioning, wind load resistance, linear thermal expansion, resistance to moisture and temperature effects, weatherability (resistance to UV0, freeze-thaw resistance, biodeterioration, flame spread index (testing to ASTM E84), ignitability (testing to NFPA 268), exterior to wall assembly fire performance (testing to NFPA 285, when required), and effect on fire resistance

rating (when required).

The requirements contained in ICC-ES AC524 (Wood-plastic Composite Products Used as Exterior Siding) formed the basis of the requirements contained in ASTM D8484.

This proposal recommends incorporating these materials specifically into the code, with reference to them meeting the requirements from ASTM D8484.

Some relevant existing code sections are shown below, for comparison.

1403.9 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D3679 by an *approved* quality control agency.

1404.14 Vinyl siding. Vinyl siding conforming to the requirements of this section and complying with ASTM D3679 shall be permitted on exterior walls where the design wind pressure determined in accordance with Section 1609 does not exceed 30 pounds per square foot (1.44 kN/m2). Where the design wind pressure exceeds 30 pounds per square foot (1.44 kN/m2), tests or calculations indicating compliance with Chapter 16 shall be submitted. Vinyl siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1404.14.1 Application. The siding shall be applied over sheathing or materials listed in Section 2304.6. Siding shall be applied to conform to the water-resistive barrier requirements in Section 1402. Siding and accessories shall be installed in accordance with the approved manufacturer's instructions.

1403.12 Polypropylene siding. Polypropylene siding shall be certified and labeled as conforming to the requirements of ASTM D7254 and those of Section 1403.12.1 or 1403.12.2 by an approved quality control agency. Polypropylene siding shall be installed in accordance with the requirements of Section 1404.18 and in accordance with the manufacturer's instructions. Polypropylene siding shall be secured to the building so as to provide weather protection for the exterior walls of the building.

1403.12.1 Flame spread index. The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E84 or UL 723.

1403.12.2 Fire separation distance. The fire separation distance between a building with polypropylene siding and the adjacent building shall be not less than 10 feet (3048 mm).

1404.18 Polypropylene siding. Polypropylene siding conforming to the requirements of this section and complying with Section 1403.12 shall be limited to exterior walls located in areas where the wind speed specified in Chapter 16 does not exceed 100 miles per hour (45 m/s) and the

building height is less than or equal to 40 feet (12 192 mm) in Exposure C. Where construction is located in areas where the basic wind speed exceeds 100 miles per hour (45 m/s), or building heights are in excess of 40 feet (12 192 mm), tests or calculations indicating compliance with Chapter 16 shall be submitted. Polypropylene siding shall be installed in accordance with the manufacturer's instructions. Polypropylene siding shall be secured to the building so as to provide

weather protection for the exterior walls of the building.

2605.3 Plastic siding. Plastic siding shall comply with the requirements of Sections 1403 and 1404.

FCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and early 2024 the FCAC has held several virtual meetings and one in-person meeting open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the **FCAC Website**

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change ensures that existing requirements for exterior wall assemblies and exterior wall coverings are applied to the use of plastic lumber and wood-plastic composite materials in those applications.

FS112-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee concluded that the proposal adds good clarification to the code text and addresses an issue that the code is silent on(Vote: 12-0).

FS112-24

Individual Consideration Agenda

Comment 1:

IBC: 1404.19, 1404.19.1, 1404.19.2

Proponents: Theresa Weston, The Holt Weston Consultancy, Rainscreen Association in North America (holtweston88@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1404.19 Plastic lumber or wood-plastic composite exterior wall covering materials. Plastic lumber materials and wood-plastic composite materials used as exterior wall coverings shall comply with this section and Section 1403.15.

Delete without substitution:

~~**1404.19.1 Design wind pressure 30 pounds per square foot or less.** Plastic lumber and wood-plastic composite exterior wall coverings materials shall be limited to exterior walls located in areas where the design wind pressure determined in Section 1609 speed does not exceed 30 pounds per square foot (1.44 kN/m^2) except as provided for in 1404.19.2.~~

Revise as follows:

~~**1404.19.2**~~ **1404.19.1 Design wind pressure** ~~**greater than 30 pounds per square foot.** Where the design wind pressured determined in Section 1609 exceeds 30 pounds per square foot (1.44 kN/m^2), tests~~ Tests or calculations indicating compliance with Chapter 16 shall be submitted.

Reason: While we do not dispute the inclusion of plastic lumber products in the code, we believe that the current proposal does not adequately address the structural performance and that "tests or calculations indicating compliance with Chapter 16 shall be submitted" at all wind pressures and not just those over 30 pounds per square foot. The proposal reason statement invokes ASTM D8484 as providing requirements for wind-load resistance. However, ASTM D8484 contains only circuitous and vague requirements for wind

design. Specifically, Table 1 "Requirements for Plastic Lumber Materials and Wood-Plastic Composite Materials: in ASTM D8484, states the criterion for "Wind Load Resistance" as "IBC or IRC". This criterion would presumably point the user back to IBC Chapter 16, but if the code in Chapter 14 excludes wind-pressures of 30 pounds per square foot or less, products would not need to comply for these lower pressures. Currently, these products are allowed as alternate materials evaluated to ICC-ES AC524. A review of published evaluation reports(1-3) shows that wind load design includes specific products, cladding orientation, and attachment spacing.

Bibliography:

1. ICC-ES Evaluation Report ESR-3923 https://icc-es.org/report-listing/esr-3923/
2. ICC-ES Evaluation Report ESR-4441 https://icc-es.org/report-listing/esr-4441/
3. ICC-ES Evaluation Report ESR-4944 https://icc-es.org/report-listing/esr-4944/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal clarifies that the structural requirements of the siding are those in the IBC Chapter 16, rather than following a circuitous route through the ASTM standards and either the IBC or the IRC.

Comment (CAH2)# 248

FS113-24

IBC: SECTION 202 (New), 1403.15 (New), 1403.15.1 (New), 1403.15.1.1 (New), ICC Chapter 35 (New)

Proposed Change as Submitted

Proponents: Keith P Nelson, DuPont, DuPont (keith.nelson@dupont.com)

2024 International Building Code

Add new definition as follows:

MAGNESIUM-OXIDE-CEMENT PANEL PRODUCT. The general name for a family of panel, board, and sheet products having a core consisting essentially of magnesium-oxide-cement and reinforced with organic or inorganic fibers.

Add new text as follows:

1403.15 Magnesium-oxide-cement panel product. *Magnesium-oxide-cement panel product* shall conform tothe requirements of ICC 1125. Installation shall be in accordance with the manufacturer's installation instructions or an *approved* design.

1403.15.1 Surface burning characteristics. *Magnesium-oxide-cement panel product* shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

1403.15.1.1 Alternate fire testing. *Magnesium-oxide-cement panel product* shall have,when tested in accordance with ASTM E2768, a *listed flame spread index* of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

1125 Standard for Classification of Magnesium Oxide Boards in Building and Construction (IS-MGOB)

Reason: The code change is introducing a new, North American construction material as defined by the ICC-1125 performance standard under development. The MgO industry desires to add these requirements to the IBC given the import of offshore materials, the scaling of North American production capacity, and the use of all these materials in commercial construction.

The surface burning characteristics limitation is similar to an existing exterior sheathing material in Section 2303.2. Applicable code requirements such as assembly fire performance tests still apply. Installation is to be in accordance with the manufacturer's instructions or an approved structural design for sheathing. The product is currently evaluated under ICC-ES Acceptance Criteria AC-386 for Fiber-Reinforced Magnesium-Oxide-Based Sheets and AC-530 for Fiber-Reinforced Magnesium-Oxide-Based Sheets with a Factory-Bonded Water-Resistive Overlay Membrane.

A Group B code proposal will be submitted for IBC Chapter 6 to address use of MgO in Type I, II and III construction:

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing and sheathing complying with Section 2303.2 and magnesium-oxide-cement panel product conforming with Section 1403.15 shall be permitted within exterior wall assemblies of a 2-hour rating or less.

603.1 Allowable materials. Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:
[...]

29. Magnesium-oxide-cement panel product conforming with Section 1403.15.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal provides another sheathing product alternative and as such does not raise or decrease the cost of construction. The designer is free to choose which sheathing product is most effective for the application. The cost to the manufacturer is neutral as the testing requirements are similar for ICC-1125 and the ICC-ES Acceptance Criteria.

FS113-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee determined that the reason for the disapproval is due to the fact that the proposed language is based on a standard that has not been approved yet (Vote: 12-0).

FS113-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202, 1403.15, 1403.15.1, 1403.15.1.1, ICC Chapter 35

Proponents: Keith P Nelson, DuPont, DuPont (keith.nelson@dupont.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

MAGNESIUM-OXIDE-CEMENT PANEL PRODUCT. The general name for a family of panel, board, and sheet products having a core consisting essentially of magnesium-oxide-cement and reinforced with organic or inorganic fibers.

Revise as follows:

1403.15 Magnesium-oxide-cement panel product. *Magnesium-oxide-cement panel product* shall conform to the requirements of ICC 1125 or as *approved* by the *building official. Magnesium-oxide-cement panel products* conforming to ICC 1125 shall be identified by the manufacturer's designation to indicate compliance with this standard. Where used structurally, the products shall be identified by the *label* of an *approved agency.* Installation shall be in accordance with the manufacturer's installation instructions or an *approved* design.

1403.15.1 Surface burning characteristics. *Magnesium-oxide-cement panel product* shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

1403.15.1.1 Alternate fire testing. *Magnesium-oxide-cement panel product* shall have,when tested in accordance with ASTM E2768, a *listed flame spread index* of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the

centerline of the burners at any time during the test.

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

1125 Standard for Classification of Magnesium Oxide Boards in Building and Construction (IS-MGOB)

Reason: In the last hearing we asked for disapproval because ICC 1125 committee had not been formed. We also received comments from interested stakeholders at the hearing and in the public comment period.

In discussion with interested parties, there was a request to identify the product and its conformance with the standard. We are proposing to mark the product to identify conformance with the standard following the language of 2024 IBC 2507.1 for Gypsum Panel Products. When used structurally, the revised proposal labeling requirement follows the language of 2303.1.7 for Hardboard.

ICC 1125 is in development and is projected to be complete and published prior to the April 2026 deadline; the content is largely based on ICC-ES AC386. The main committee has been formed and as of this writing has met twice with multiple meetings with the four work groups including: WG1 Administration and Definitions, WG2 Wall Sheathing and Floor Underlayment, WG3 Roof and Floor Sheathing, and WG4 Tile Substrate.

This proposal is to address the increased use of magnesium-oxide-cement panel product in buildings utilizing alternative means and methods provisions. Acceptance of this proposal will establish minimum performance requirements, quality, and consistency with the intent of the original code proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modification to the original proposal presented in this comment provides additional clarification to the original proposal with regard to compliance of magnesium-oxide-cement panel products. The proposal remains one that regards another sheathing product alternative that, as such, does not increase or decrease the cost of construction.

Comment (CAH2)# 309

FS117-24

IBC: 2603.1.1, IAPMO/ANSI (New)

Proposed Change as Submitted

Proponents: Justin Davis, Self

2024 International Building Code

Revise as follows:

2603.1.1 Spray-applied foam plastic. Single- and multiple-component *spray-applied foam plastic* insulation shall comply with the provisions of Section 2603 and either ICC 1100 or IAPMO/ANSI ES1000.

Add new text as follows:

IAPMO/ANSI ES. 1000-2020- Building Code Compliance Spray-Applied Polyurethane Foam

Reason: To allow the use of an additional active consensus standard for use showing compliance with the International Building Code. Historically, the codes have included multiple standards that have been used to show compliance. IAPMO/ANSI ES1000 is in the process of being updated at this time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The new standard is an option to what is already in place in the code.

FS117-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal due to the fact that there are many questions regarding the standard. The committee indicated that the reason statement does not include details on the necessity of the proposal (Vote: 12-0).

FS117-24

Individual Consideration Agenda

Comment 1:

Proponents: Justin Davis, Self, Self requests As Submitted

Reason: Approving the IAPMO/ANSI ES1000 standard provides many advantages to both the building industry and to the general public. The spray foam industry is very innovative and constantly developing methods to use spray foam products. As of Summer 2024, the existing standard in the 2021 International Codes is 5 years old. One update in the past five years does not capture the progress the

spray foam industry has made. Multiple standards will offer more opportunities to reflect the progress.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 557

FS121-24

IBC: 2603.9

Proposed Change as Submitted

Proponents: Eric Banks, e.w.banks consulting llc, North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com)

2024 International Building Code

Revise as follows:

2603.9 Special approval. Foam plastic and assemblies containing foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically *approved* based on one of the following large-scale tests:

1. NFPA 286 using the acceptance criteria of Section 803.1.1.1.
2. Room Test of FM 4880.
3. ~~UL 1040.~~
4. ~~4~~ 3. UL 1715.

Such testing shall be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason: The proposed change brings the approved test methods of 2603.9 Special Approval in-line with the Integrity Fire Tests (Part II) of NFPA 275 *Standard Method of Fire Tests for the Evaluation of Thermal Barriers*. NFPA 275 is a performance testing option referenced in the requirements of Section 2603.4 Thermal barrier. Section 2603.9 Special approval provides another performance test option to permit the use of foam plastic insulation without the thermal barrier required in Section 2603.4 by demonstrating equivalent performance – i.e., no flashover for a period of at least 15-minutes.

The FM 4880 approval standard contains four (4) different large-scale fire tests (Room Test, 16-ft High Parallel Panel Test, 25-ft High Corner Test, and 50-ft High Corner Test) and a series of performance ratings defined by insulation type, facer type, and a prescribed series of tests. It is understood that the 25-ft and 50-ft High Corner Tests have not been performed on foam plastic panels / assemblies for many years, in part due to the availability of the Room Test option provided in FM 4880.

The NFPA 275 Standard Method of Fire Tests for the Evaluation of Thermal Barriers, referenced in Section 2603.4, also generically referenced FM 4880 among the approved test methods for the Integrity Fire Tests (Part II) of the evaluation. The 2022 Edition of NFPA 275, however, was revised to was more clearly and specifically reference the Room Test of FM 4880.

The UL 1040 is also a very large-scale test, using a 20-ft by 20-ft by 30-ft high open-corner configuration, a 764-pound wood crib ignition source and a 30-minute test duration. This test has also not been performed in many years due, to its size, associated cost, and the availability of NFPA 286 and UL 1715 . The NFPA 275 Standard Method of Fire Tests for the Evaluation of Thermal Barriers, referenced in Section 2603.4, referenced UL 1040 among the approved test methods for the Integrity Fire Tests (Part II), however, it was removed from the 2022 Edition of NFPA 275.

The changes will improve the consistency of the evaluations performed under Section 2603.9 and its intent in terms of the Special Approval in reference to Section 2603.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change provides clarification regarding the existing tests required for compliance with Section 2603.9.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reason for the disapproval is because the proposal deletes a necessary standard that needs to be maintained in the code (Vote: 11-1).

FS121-24

Individual Consideration Agenda

Comment 1:

IBC: 2603.9

Proponents: Eric Banks, e.w.banks consulting llc, North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

2603.9 Special approval. Foam plastic and assemblies containing foam plastic shall not be required to comply with the requirements of Section 2603.4 or those of Section 2603.6 where specifically *approved* based on one of the following large-scale tests:

1. NFPA 286 using the acceptance criteria of Section 803.1.1.1.
2. Room Test of FM 4880.
3. UL 1040.
4. ~~3~~ 4. UL 1715.

Such testing shall be performed on the finished manufactured foam plastic assembly in the maximum thickness intended for use. Foam plastics that are used as *interior finish* on the basis of these tests shall also conform to the *flame spread* and smoke-developed requirements of Chapter 8. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.

Reason:
We, the proponent, are submitting this comment to modify proposal FS121-24 based on testimony provided during Group A CAH #1, the committee discussion, and the committee action. The modification reverses the original proposal's removal of UL 1040 from Section 2603.9.

Committee action for disapproval of FS121-24 indicated agreement with testimony opposed to removing UL 1040 as a compliance option for the Special Approval under Section 2603.9. Subsequent further review of UL's Product iQ online directory shows four (4) of the five (5) active listings for UL 1040 (UL Category Code: NYWR) were updated between 2018 and 2023 with the fifth listing as last updated in 1996. These recent updates demonstrate that manufacturers are maintaining listings regarding UL 1040, regardless of whether or not new tests are being conducted.

No testimony was provided in opposition to clarifying the Room Test of ANSI / FM 4880, nor did the committee discuss the issue or

comment on it in the Committee Reason for disapproval of FS121-24.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modification presented in this public comment reverses the as-submitted proposal's removal of an existing compliance option, therefore, the proposal remains one that is editorial in nature or a clarification and with no impact on the cost of construction.

Comment (CAH2)# 294

E1-24 Part I

IBC: SECTION 202 (New), 703.5, 1004.7, 1011.5.5.3, 1011.7.1, 1015.2, 1607.9.1.1, 1704.2.2, 1807.2.5, 2111.3.1, 2113.9.2, 2405.3.3, 2406.4.3, 3008.9, F101.5.1, H110.1; IFC: [BE] 1004.7, [BE] 1011.5.5.3, [BE] 1011.7.1, [BE] 1015.2

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

THIS IS A 5 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE.

PART II AND III WILL BE HEARD BY THE FIRE/WILDLAND-URBAN INTERFACE CODE COMMITTEE.

PART IV WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

PART V WILL BE HEARD BY THE RESIDENTIAL CODE - PLUMBING & MECHANICAL CODE COMMITTEE.
SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

ACCESS (TO). That which enables a device, an *appliance* or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also “Ready access (to)”].

READY ACCESS (TO). That which enables a device, *appliance* or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see also “Access (to)”].

Revise as follows:

703.5 Marking and identification. Where ~~there is an accessible~~ access is provided to a concealed space that is located under a floor, within a floor-ceiling or an *attic* space, *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and *smoke partitions* or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:

1. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
2. Include lettering not less than 3 inches (76 mm) in height with a minimum $^{3}/_{8}$-inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording, “FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS,” or other wording.

1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas. **Exceptions:**

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

1011.5.5.3 Solid risers. Risers shall be solid. **Exceptions:**

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~accessible~~ open to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~accessible~~ open to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9. **Exceptions:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not ~~accessible~~ open to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

1607.9.1.1 Uniform load. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. This load need not be assumed to act concurrently with the concentrated load specified in Section 1607.9.1. **Exceptions:**

1. For one- and two-family *dwellings*, only the single concentrated *load* required by Section 1607.9.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are not ~~accessible~~ open to the ~~general~~ public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).
3. For roofs not intended for occupancy, only the single concentrated load required by Section 1607.9.1 shall be applied.

1704.2.2 Access for special inspection. The construction or work for which *special inspection* or testing is required shall remain ~~accessible and~~ exposed and with access for *special inspection* or testing purposes until completion of the required *special inspections* or tests.

1807.2.5 Guards. *Guards* shall be provided at retaining walls in accordance with Sections 1807.2.5.1 through 1807.2.5.3. **Exception:** *Guards* are not required at retaining walls in areas not ~~accessible~~ open to the public.

2111.3.1 Ash dump cleanout. Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or *masonry* doors and frames constructed to remain tightly closed, except when in use. Cleanouts shall be ~~accessible~~ provided with access and located so that ash removal will not create a hazard to combustible materials.

2113.9.2 Spark arrestors. Where a spark arrestor is installed on a *masonry* chimney, the spark arrestor shall meet all of the following requirements:

1. The net free area of the arrestor shall be not less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and *corrosion resistance* equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than $^1/_2$ inch (12.7 mm) nor block the passage of spheres having a diameter less than $^3/_8$ inch (9.5 mm).
4. The spark arrestor shall be ~~accessible~~ provided with access for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2405.3.3 Screening not required in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, retention screens are not required for any of the following:

1. Fully tempered glass where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and the highest point of the glass is 10 feet (3048 mm) or less above the walking surface.
2. Any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface ~~or other accessible area~~.
   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.
5. Laminated glass with a 15-mil (0.38 mm) polyvinyl butyral or equivalent interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface ~~or other accessible area~~.

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. *Decorative glazing*.
2. Where a horizontal rail is installed on the ~~accessible~~ walking surfaces side ~~(s)~~ of the glazing at 34 to 38 inches (864 to 965 mm) above the walking surface, the ~~. The~~ rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1\,^{1}/_{2}$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 8 feet (2438 mm) or more above any grade or walking surface adjacent to the glass exterior.

3008.9 Emergency voice/alarm communication system. The *building* shall be provided with an *emergency voice/alarm communication system*. ~~The *emergency voice/alarm communication system* shall be accessible to the fire department. The system shall be provided~~ in accordance with Section 907.5.2.2.

F101.5.1 Rodent ~~accessible~~ access to openings. Windows and other openings for the purpose of light and ventilation in the *exterior walls* not covered in this chapter, ~~accessible to~~ that are susceptible to entry by rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035-inch (0.89 mm) wire. In lieu of wire cloth covering, said pipes, wires, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61 mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits or other appurtenances. In addition, they shall be fastened securely to and shall extend perpendicularly from the *exterior wall* for not less than 12 inches (305 mm) beyond and on either side of pipes, wires, conduits or appurtenances.

H110.1 General. *Roof signs* shall be constructed entirely of metal or other *approved* noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. *Roof signs* shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the *sign* and shall have not less than 5 feet (1524 mm) clearance between the vertical supports thereof. *Roof sign structures* shall not project beyond an *exterior wall*. **Exception:** *Signs* on flat roofs ~~with every part of the roof accessible~~ where there is access to the signs.

2024 International Fire Code

Revise as follows:

[BE] 1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

[BE] 1011.5.5.3 Solid risers. Risers shall be solid. **Exceptions:**

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~accessible~~ open to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~accessible~~ open to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code. **Exception:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not ~~accessible~~ open to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.
Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Insert FCAC paragraph

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned

International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

E1-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: While this is a good clarification for the defined term accessible, in several sections, there was concern about "open" being interpreted as open for business, and not unrestricted access. This would be consistent with comments on E1-24 Part III heard by the Fire Committee. (Vote: 8-4)

E1-24 Part I

Individual Consideration Agenda

Comment 1:

IBC: 1011.5.5.3, 1011.7.1, 1015.2, 1607.9.1.1, 1807.2.5, 2405.3.3; IFC: [BE] 1011.5.5.3, [BE] 1011.7.1, [BE] 1015.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Revise as follows:

1011.5.5.3 Solid risers. Risers shall be solid. **Exceptions:**

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~open to~~ that can be accessed by the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~open to~~ that can be accessed by the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9. **Exceptions:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits ~~not open to~~ that cannot be accessed by the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

1607.9.1.1 Uniform load. *Handrails* and *guards* shall be designed to resist a linear *load* of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1.1 of ASCE 7. This load need not be assumed to act concurrently with the concentrated load specified in Section 1607.9.1. **Exceptions:**

1. For one- and two-family *dwellings*, only the single concentrated *load* required by Section 1607.9.1 shall be applied.
2. In Group I-3, F, H and S occupancies, for areas that are ~~not open to~~ that cannot be accessed by the public and that have an *occupant load* less than 50, the minimum *load* shall be 20 pounds per foot (0.29 kN/m).
3. For roofs not intended for occupancy, only the single concentrated load required by Section 1607.9.1 shall be applied.

1807.2.5 Guards. *Guards* shall be provided at retaining walls in accordance with Sections 1807.2.5.1 through 1807.2.5.3. **Exception:** *Guards* are not required at retaining walls in areas ~~not open to~~ that cannot by accessed by the public.

2405.3.3 Screening not required in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, retention screens are not required for any of the following:

1. Fully tempered glass where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and the highest point of the glass is 10 feet (3048 mm) or less above the walking surface.
2. Any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and ~~not open to~~ that cannot be access by the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.

4. Individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:

   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.

   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface .

   4.3. The glass thickness is $^3/_{16}$ inch (4.8 mm) or less.

5. Laminated glass with a 15-mil (0.38 mm) polyvinyl butyral or equivalent interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:

   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.

   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface .

2024 International Fire Code

Revise as follows:

[BE] 1011.5.5.3 Solid risers. Risers shall be solid. **Exceptions:**

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas ~~open to~~ that can be accessed by the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1011.10.

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* ~~open to~~ that can be accessed by the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of *occupiable roofs* . *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code. **Exception:** *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits ~~not open to~~ that cannot be accessed by the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.

8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: The BCAC has split this comment into two parts. The proposed definitions, and the remainder of the proposal are in our 2nd comment with no revisions.

The MOE committee had a concern about 'open to the public' and how that would be understood. This modification provides an alternative. In addition, Section 2405.3.3 Item 3, where 'open to the public' is currently used, has been revised for consistency. This provides coordination across codes and remove the use of 'accessible' where it does not meet the same intent as the defined term. The BCAC has a proposal in for Part 3 for IWUIC for a similar issue. Part 2, 4 and 5 for IFC, IMC and IRC were approved.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See original reason statement for additional information on coordination with previous proposals.

Comment (CAH2)# 121

Comment 2:

IBC: SECTION 202, 703.5, 1004.7, 1704.2.2, 2111.3.1, 2113.9.2, 2405.3.3, 2406.4.3, 3008.9, F101.5.1, H110.1; IFC: [BE] 1004.7

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

ACCESS (TO). That which enables a device, an *appliance* or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also “Ready access (to)”].

READY ACCESS (TO). That which enables a device, *appliance* or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see also “Access (to)”].

703.5 Marking and identification. Where ~~there is an accessible~~ access is provided to a concealed space that is located under a floor, within a floor-ceiling or an *attic* space, *fire walls*, *fire barriers*, *fire partitions*, *smoke barriers* and *smoke partitions* or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:

1. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
2. Include lettering not less than 3 inches (76 mm) in height with a minimum $^{3}/_{8}$-inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording, “FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS,” or other wording.

1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of*

egress requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas. **Exceptions:**

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

1704.2.2 Access for special inspection. The construction or work for which *special inspection* or testing is required shall remain ~~accessible and~~ exposed and with access for *special inspection* or testing purposes until completion of the required *special inspections* or tests.

2111.3.1 Ash dump cleanout. Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or *masonry* doors and frames constructed to remain tightly closed, except when in use. Cleanouts shall be ~~accessible~~ provided with access and located so that ash removal will not create a hazard to combustible materials.

2113.9.2 Spark arrestors. Where a spark arrestor is installed on a *masonry* chimney, the spark arrestor shall meet all of the following requirements:

1. The net free area of the arrestor shall be not less than four times the net free area of the outlet of the chimney flue it serves.
2. The arrestor screen shall have heat and *corrosion resistance* equivalent to 19-gage galvanized steel or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter greater than $^{1}/_{2}$ inch (12.7 mm) nor block the passage of spheres having a diameter less than $^{3}/_{8}$ inch (9.5 mm).
4. The spark arrestor shall be ~~accessible~~ provided with access for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2405.3.3 Screening not required in monolithic and multiple-layer sloped glazing systems. In monolithic and multiple-layer sloped glazing systems, retention screens are not required for any of the following:

1. Fully tempered glass where glazed between intervening floors at a slope of 30 degrees (0.52 rad) or less from the vertical plane, and the highest point of the glass is 10 feet (3048 mm) or less above the walking surface.
2. Any glazing material, including annealed glass, where the walking surface below the glazing material is permanently protected from the risk of falling glass or the area below the glazing material is not a walking surface.
3. Any glazing material, including annealed glass, in the sloped glazing systems of commercial or detached noncombustible *greenhouses* used exclusively for growing plants and not open to the public, provided that the height of the *greenhouse* at the ridge does not exceed 30 feet (9144 mm) above grade.
4. Individual *dwelling units* in Groups R-2, R-3 and R-4 where fully tempered glass is used as single glazing or as both panes in an insulating glass unit, and all of the following conditions are met:
   4.1. Each pane of the glass is 16 square feet (1.5 m^2) or less in area.
   4.2. The highest point of the glass is 12 feet (3658 mm) or less above any walking surface ~~or other accessible area~~.
   4.3. The glass thickness is $^{3}/_{16}$ inch (4.8 mm) or less.
5. Laminated glass with a 15-mil (0.38 mm) polyvinyl butyral or equivalent interlayer used in individual *dwelling units* in Groups R-2, R-3 and R-4 where both of the following conditions are met:
   5.1. Each pane of glass is 16 square feet (1.5 m^2) or less in area.
   5.2. The highest point of the glass is 12 feet (3658 mm) or less above a walking surface or other accessible area
   .

2406.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be

considered to be a hazardous location:

1. The exposed area of an individual pane is greater than 9 square feet (0.84 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor or adjacent walking surface.
3. The top edge of the glazing is greater than 36 inches (914 mm) above the floor or adjacent walking surface.
4. One or more walking surface(s) are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. *Decorative glazing*.
2. Where a horizontal rail is installed on the ~~accessible~~ walking surfaces side of the glazing at 34 to 38 inches (864 to 965 mm) above the walking surface, the . ~~The~~ rail shall be capable of withstanding a horizontal *load* of 50 pounds per linear foot (730 N/m) without contacting the glass and be not less than $1\,^1/_2$ inches (38 mm) in cross-sectional height.
3. Outboard panes in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 8 feet (2438 mm) or more above any grade or walking surface adjacent to the glass exterior.

3008.9 Emergency voice/alarm communication system. The *building* shall be provided with an *emergency voice/alarm communication system* ~~The emergency voice/alarm communication system shall be accessible to the fire department. The system shall be provided~~ in accordance with Section 907.5.2.2.

Revise as follows:

F101.5.1 Rodent access to openings. Windows and other openings for the purpose of light and ventilation in the *exterior walls* not covered in this chapter, ~~accessible to~~ that are susceptible to entry by rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035-inch (0.89 mm) wire. In lieu of wire cloth covering, said pipes, wires, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61 mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits or other appurtenances. In addition, they shall be fastened securely to and shall extend perpendicularly from the *exterior wall* for not less than 12 inches (305 mm) beyond and on either side of pipes, wires, conduits or appurtenances.

H110.1 General. *Roof signs* shall be constructed entirely of metal or other *approved* noncombustible material except as provided for in Sections H106.1.1 and H107.1. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated therefrom. *Roof signs* shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the *sign* and shall have not less than 5 feet (1524 mm) clearance between the vertical supports thereof. *Roof sign structures* shall not project beyond an *exterior wall*. **Exception:** *Signs* on flat roofs with every part of the roof accessible where there is access to the signs
.

2024 International Fire Code

[BE] 1004.7 Outdoor areas. *Yards*, patios, *occupiable roofs* , *courts* and similar outdoor areas ~~accessible to and usable~~ intended for use by the *building* occupants shall be provided with *means of egress* as required by this chapter. The *occupant load* of such outdoor areas shall be assigned by the *building official* in accordance with the anticipated use. Where outdoor areas are to be used by *persons* in addition to the occupants of the *building*, and the path of egress travel from the outdoor areas passes through the *building*, *means of egress* requirements for the *building* shall be based on the sum of the *occupant loads* of the *building* plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one *means of egress*.
2. Both outdoor areas associated with Group R-3 and individual *dwelling units* of Group R-2.

Reason: The BCAC committee has split this proposal into two part. The testimony at the spring hearings were all in regard to 'open to the public'. This is addressed in a separate comment.

These sections are for the removal of 'accessible' where it is not related to access for people with disabilities, and to add the appropriate definitions for access to equipment. The IFC already contains these definitions, as well as multiple other I-Codes. There are no proposed revision to these sections from the original proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

Comment (CAH2)# 223

NOTE: E1-24 PART II DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

E1-24 Part II

IFC: SECTION 202, 907.8.2

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

Revise as follows:

WILDFIRE RISK AREA. Land that is covered with grass, grain, brush or forest, whether privately or publicly owned, ~~which is so situated or is of such inaccessible location that~~ where a fire originating upon it would present an abnormally difficult job of suppression or would result in great or unusual damage through fire or such areas designated by the *fire code official*.

907.8.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the *fire code official*. Records of testing shall be maintained. **Exception:** Devices or equipment ~~that are inaccessible~~ located without access because of safety considerations shall be tested during scheduled shutdowns where *approved* by the *fire code official*, but not less than every 18 months.

Reason: Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.
Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Insert FCAC paragraph

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on

coordination with previous proposals.

E1-24 Part II

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for the approval of the proposal was that it is a good clean up to coordinate the codes and eliminates any confusion by replacing words that can be misunderstood. (Vote: 13-0)

E1-24 Part II

E1-24 Part III

IWUIC: A103.2, TABLE C101.1, G101.3.2

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Wildland Urban Interface Code

Revise as follows:

A103.2 ~~Trespassing on posted private property~~ Restricted areas. Where the *code official* determines that a specific area within a *wildland-urban interface area* presents an exceptional and continuing fire danger because of the density of natural growth, difficulty of terrain, proximity to structures or ~~accessibility~~ open to the public, such areas shall be restricted or closed until changed conditions warrant termination of such restriction or closure. Such areas shall be posted in accordance with Section A103.2.1.

TABLE C101.1 FIRE HAZARD SEVERITY FORM

Portions of table not shown remain unchanged.

A. Subdivision Design Points	
3. ~~Accessibility~~ Vehicle access	
Road grade 5% or less	1___
Road grade more than 5%	3___

G101.3.2 Alternative water supply systems for exposure protection. Pools and spas are often offered as an alternative water source for fire departments. These water sources must be reliable and able to be accessed to be of any use by fire protection forces. ~~Accessibility~~ Access means that the fire department ~~must be~~ is able to withdraw the water without having to go through extraordinary measures such as knocking down fences or having to set up drafting situations. Designs have been created to put liquid- or gas-fueled pumps or gravity valves on pools and spas to allow fire departments to access these water systems. A key vulnerability to the use of these alternative water systems is loss of electrical power. When the reliability of a water system depends on external power sources, it cannot be relied upon by fire fighters to be available in a worst-case scenario.

Reason: Because the term ‘accessible’ is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term ‘access (to)’ or ‘ready access (to)’ for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.

Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Insert FCAC paragraph

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

E1-24 Part III

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: There was disagreement over the deletion and replacement of the existing word “accessibility” in Section A103.2 and that the word replacement needs to be determined outside of the hearings. (Vote: 12-1)

E1-24 Part III

Individual Consideration Agenda

Comment 1:

IWUIC: A103.2

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Wildland Urban Interface Code

Revise as follows:

A103.2 Restricted areas. Where the *code official* determines that a specific area within a *wildland-urban interface area* presents an exceptional and continuing fire danger because of the density of natural growth, difficulty of terrain, proximity to structures or that can be accessed by ~~open to~~ the public, such areas shall be restricted or closed until changed conditions warrant termination of such restriction or closure. Such areas shall be posted in accordance with Section A103.2.1.

Reason: The committee had a concern about 'open to the public' and how that would be understood. This modification provides an alternative. The remainder of the proposal has no revisions. This provides coordination across codes and remove the use of 'accessible' where it does not meet the same intent as the defined term. The BCAC has a proposal in for Part 1 for IBC for a similar issue. Part 2, 4 and 5 for IFC, IMC and IRC were approved.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See original reason statement for additional information on coordination with previous proposals.

Comment (CAH2)# 124

NOTE: E1-24 PART IV DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

E1-24 Part IV

IFC: SECTION 202; IFGC: SECTION 202; IMC®: SECTION 202, 506.3.8, 603.4.1; IPC: SECTION 202, 712.2, 1111.1

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Fire Code

[M] ACCESS (TO). That which enables a device, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "Ready access (to)"].

Revise as follows:

[M] READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see also "Access (to)"].

2024 International Fuel Gas Code

Revise as follows:

[M] ACCESS (TO). That which enables a device, *appliance* or *equipment* to be reached by *ready access* or by a means that first requires the removal or movement of a panel, ~~door~~ or similar obstruction (see also "Ready access (to)").

[M] READY ACCESS (TO). That which enables a device, *appliance* or *equipment* to be directly reached, without requiring the removal or movement of any panel~~, door~~ or similar obstruction (see also "*Access (to)*").

2024 International Mechanical Code

ACCESS (TO). That which enables a device, *appliance* or *equipment* to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction [see also "*Ready access (to)*"].

Revise as follows:

NET OCCUPIABLE FLOOR AREA. The floor area of an *occupiable space* defined by the inside surfaces of its walls but excluding shafts, column enclosures and other permanently enclosed, ~~inaccessible and~~ unoccupiable areas and not provided with access. Obstructions in the space such as furnishings, display or storage racks and other obstructions, whether temporary or permanent, shall not be deducted from the space area.

READY ACCESS (TO). That which enables a device, *appliance* or *equipment* to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see also "*Access (to)*"].

506.3.8 Grease duct cleanouts and openings. Grease duct cleanouts and openings shall comply with all of the following:

1. Grease ducts shall not have openings except where required for the operation and maintenance of the system.
2. Sections of grease ducts ~~that are inaccessible~~ that cannot be accessed from the hood or discharge openings shall be provided with cleanout openings spaced not more than 20 feet (6096 mm) apart and not more than 10 feet (3048 mm) from changes in direction greater than 45 degrees (0.79 rad).
3. Cleanouts and openings shall be equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the grease duct.

4. Cleanout doors shall be installed liquid tight.
5. Door assemblies including any frames and gaskets shall be *approved* for the application and shall not have fasteners that penetrate the grease duct.
6. Gasket and sealing materials shall be rated for not less than 1,500°F (816°C).
7. *Listed* door assemblies shall be installed in accordance with the manufacturer's instructions.

603.4.1 Minimum fasteners. Round metallic ducts shall be mechanically fastened by means of not less than three sheet metal screws or rivets spaced equally around the joint.

Exception: Where a duct connection is made that ~~is~~ partially ~~inaccessible~~ cannot be accessed, three screws or rivets shall be equally spaced on the exposed portion so as to prevent a hinge effect.

2024 International Plumbing Code

Revise as follows:

[M] ACCESS (TO). That which enables a fixture, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction (see also "Ready access (to)").

[M] READY ACCESS (TO). That which enables a fixture, appliance or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction ~~and without the use of a portable ladder, step stool or similar device~~ (see also "Access (to)").

712.2 Valves required. A check valve and a full-open valve located on the discharge side of the check valve shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. *Access* shall be provided to such valves. Such valves shall be located above the sump cover required by Section 712.1 or, where the discharge pipe from the ejector is below grade, the valves shall be ~~accessibly~~ located outside the sump below grade in an access pit with a removable *access* cover.

1111.1 Subsoil drains. Subsoil drains shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards listed in Table 1102.5. Such drains shall be not less than 4 inches (102 mm) in diameter. Where the building is subject to backwater, the subsoil drain shall be protected by ~~an accessibly located~~ a backwater valve that is provided with access. Subsoil drains shall discharge to a trapped area drain, sump, dry well or *approved* location above ground. The subsoil sump shall not be required to have either a gastight cover or a vent. The sump and pumping system shall comply with Section 1113.1.

Reason: Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.
Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

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Insert FCAC paragraph

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Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

E1-24 Part IV

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee voted to approve the proposal as submitted by 12-2. Since the word "accessible" is most frequently associated with the need for access for people with disabilities, the committee has agreed with the proponent to change the remaining codes to remove the word "accessible" and replace it with other words, defined terms, or phrases that do not imply the need for access for people who are physically disabled. Where coordination changes were either overlooked or included in new code changes, this proposal brings clarity and consistency to the remaining codes. It aims to facilitate correlation with earlier proposal initiatives.

E1-24 Part IV

NOTE: E1-24 PART V DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

E1-24 Part V

IRC: TABLE M1306.2, M1803.4.1, M2006.2, P2704.1, P2706.1, P2712.6, P2720.2, P2722.4, P2903.9.5, P2903.10.1, P2903.10.2, P2903.10.3, P2903.11, P2911.5, P2911.8.1, P2911.9, P2912.4, P2912.8, P2912.12, P3005.1.5, P3007.2, P3007.3.2, P3302.1, P3303.1.2, P3303.1.4

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

TABLE M1306.2 REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION [a, c, d, e, f, g, h, i, j, k, l]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per cubic foot = 16.019 kg/m^3, °C = [(°F) – 32/1.8], 1 Btu/(h × ft^2 × °F/in.) = 0.001442299 (W/cm^2 × °C/cm).

a. Reduction of clearances from combustible materials shall not interfere with combustion air, draft hood clearance and relief, and ~~accessibility of~~ access for servicing.

b. Clearances shall be measured from the surface of the heat-producing appliance or equipment to the outer surface of the combustible material or combustible assembly.

c. Spacers and ties shall be of noncombustible material. Spacers and ties shall not be used directly opposite appliance or connector.

d. Where all clearance reduction systems use a ventilated airspace, adequate provision for air circulation shall be provided as described (see Figures M1306.1 and M1306.2).

e. There shall be not less than 1 inch between clearance reduction systems and combustible walls and ceilings for reduction systems using ventilated airspace.

f. If a wall protector is mounted on a single flat wall away from corners, adequate air circulation shall be permitted to be provided by leaving only the bottom and top edges or only the side and top edges open with not less than a 1-inch air gap.

g. Mineral wool and glass fiber batts (blanket or board) shall have a minimum density of 8 pounds per cubic foot and a minimum melting point of 1,500°F.

h. Insulation material used as part of a clearance reduction system shall have a thermal conductivity of 1.0 Btu inch per square foot per hour °F or less. Insulation board shall be formed of noncombustible material.

i. There shall be not less than 1 inch between the appliance and the protector. The clearance between the appliance and the combustible surface shall not be reduced below that allowed in this table.

j. All clearances and thicknesses are minimum; larger clearances and thicknesses are acceptable.

k. Listed single-wall connectors shall be permitted to be installed in accordance with the terms of their listing and the manufacturer's instructions.

l. For limitations on clearance reduction for solid-fuel-burning appliances, see Section M1306.2.3.

M1803.4.1 Closure and ~~accessibility~~ access. A noncombustible seal shall be provided below the point of connection to prevent entry of room air into the flue. Means shall be provided for *access to* the flue for inspection and cleaning.

M2006.2 Clearances. The clearances shall not interfere with *combustion air*, draft hood or flue terminal relief, or ~~accessibility~~ access for servicing.

P2704.1 Slip joints. Slip-joint connections shall be installed only for tubular waste piping and only between the waste outlet of a fixture and the connection to the drainage piping. Slip-joint connections shall be made with an *approved* elastomeric sealing gasket. Slip-joint connections shall ~~be accessible. Such access shall provide~~ be provided with access. Such access shall be provided by an opening that is not less than 12 inches (305 mm) in its smallest dimension.

P2706.1 General. For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, attics, *crawl spaces* or interstitial spaces above ceilings and below floors. Ready access to waste ~~Waste~~ receptors shall be provided~~readily accessible~~.

P2712.6 Access. ~~Parts~~ Access to the parts in a flush tank shall be ~~accessible~~ provided for repair and replacement.

P2720.2 Piping drainage. The circulation pump shall be ~~accessibly~~ located above the crown weir of the trap. Access to the circulation pump shall be provided. The pump drain line shall be properly graded to ensure minimum water retention in the volute after fixture use. The circulation piping shall be installed to be self-draining.

P2722.4 Individual pressure-balancing in-line valves for individual fixture fittings. Individual pressure-balancing in-line valves for individual fixture fittings shall comply with ASSE 1066. Such valves ~~shall be installed in an accessible location and~~ shall not be used as a substitute for the balanced pressure, thermostatic or combination shower valves required in Section P2708.4. Access to such valves shall be provided.

P2903.9.5 Hose bibb bleed. ~~A *readily accessible*~~ An air bleed shall be installed in hose bibb supplies at the manifold or at the hose bibb exit point. Ready access to the air bleed shall be provided.

P2903.10.1 Service valve. Each *dwelling unit* shall be provided with a ~~an accessible~~ *main* shutoff valve near the entrance of the water service. The valve shall be of a full-open type having nominal restriction to flow, with provision for drainage such as a bleed orifice or installation of a separate drain valve. Additionally, the water service shall be valved at the curb or *lot line* in accordance with local requirements.

P2903.10.2 Water heater valve. A ~~readily accessible~~ full-open valve with ready access shall be installed in the cold-water supply pipe to each water heater at or near the water heater.

P2903.10.3 Fixture valves and access. Shutoff valves shall be required on each fixture supply pipe to each plumbing *appliance* and to each plumbing fixture other than bathtubs and showers. ~~Valves~~ Access shall be provided to valves serving individual plumbing fixtures, *plumbing appliances,* risers and branches ~~shall be accessible~~.

P2903.11 Hose bibb. Hose bibbs subject to freezing, including the "frostproof" type, shall be equipped with ~~an accessible~~ a stop-and-waste-type valve inside the *building* so that they can be controlled and drained during cold periods. **Exception:** Frostproof hose bibbs installed such that the stem extends through the building insulation into an open heated or *semiconditioned space* need not be separately valved (see Figure P2903.11).

P2911.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Access shall be provided to filters ~~Filters shall be accessible~~ for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P2911.8.1 Bypass valve. One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources to the sanitary sewer to allow servicing and inspection of Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Access shall be provided to bypass ~~Bypass~~ valves ~~shall be installed in accessible locations~~. Two shutoff valves shall not be installed to serve as a bypass valve.

P2911.9 Pumping and control system. Access shall be provided to mechanical ~~Mechanical~~ equipment including pumps, valves and filters ~~shall be accessible~~ and shall be removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2912.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the *jurisdiction*.Access shall be provided to roof ~~Roof~~ washers ~~shall be accessible~~ for maintenance and service.

P2912.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Access shall be provided to filters ~~Filters shall be accessible~~ for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P2912.12 Pumping and control system. Access shall be provided to mechanical ~~Mechanical~~ equipment, including pumps, valves and filters ~~shall be easily accessible~~ and shall be removable in order to perform repair, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3005.1.5 Provisions for future fixtures. Where drainage has been roughed-in for future fixtures, the drainage unit values of the future fixtures shall be considered in determining the required drain sizes. Such future installations shall be terminated with ~~an accessible~~ a permanent plug or cap fitting. Access to such plugs or caps shall be provided.

P3007.2 Valves required. A check valve and a *full open valve* located on the discharge side of the check valve shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. Access shall be provided to such valves. Such valves shall be located above the sump cover required by Section P3007.3.2 or, where the discharge pipe from the ejector is below grade, the valves shall be ~~accessibly~~ located outside the sump below grade in an access pit with a removable access cover.

P3007.3.2 Sump. The sump shall be not less than 18 inches (457 mm) in diameter and 24 inches (610 mm) deep, unless otherwise *approved*. ~~The sump shall be accessible and~~ Access shall be provided to the sump. The sump shall be located so that drainage flows into the sump by gravity. The sump shall be constructed of tile, concrete, steel, plastic or other *approved* materials. The sump bottom shall be solid and provide permanent support for the pump. The sump shall be fitted with a gastight removable cover that is installed not more than 2 inches (51 mm) below grade or floor level. The cover shall be adequate to support anticipated loads in the area of use. The sump shall be vented in accordance with Chapter 31.

P3302.1 Subsoil drains. *Subsoil drains* shall be open-jointed, horizontally split or perforated pipe conforming to one of the standards indicated in Table P3302.1. Such drains shall be not less than 4 inches (102 mm) in diameter. Where the *building* is subject to backwater, the *subsoil drain* shall be protected by ~~an accessibly located~~ backwater valve. Access shall be provided to the backwater valve. *Subsoil drains* shall discharge to a trapped area drain, sump, dry well or *approved* location above ground. The subsoil sump shall not be required to have either a gastight cover or a vent. The sump and pumping system shall comply with Section P3303.

P3303.1.2 Sump pit. The sump shall be not less than 18 inches (457 mm) in diameter and 24 inches (610 mm) deep, unless otherwise *approved*. ~~The sump shall be *accessible* and The sump shall be accessible~~ Access shall be provided to the sump. The sump shall be located so that all drainage flows into the sump by gravity. The sump shall be constructed of tile, steel, plastic, cast iron, concrete or other *approved* material, with a removable cover adequate to support anticipated loads in the area of use. The sump floor shall be solid and provide permanent support for the pump.

P3303.1.4 Piping. Discharge piping shall meet the requirements of Sections P3002.1, P3002.2, P3002.3 and P3003. Discharge piping shall include ~~an *accessible*~~ afull-flow check valve that is provided with access. Pipe and fittings shall be the same size as, or larger than, the pump discharge tapping.

Reason: Because the term 'accessible' is most commonly understood as requiring access for persons with disabilities we are making the changes to delete the word accessible from the remaining codes and replace it with other words, defined terms or phrases that are not attributed to requiring access for the physically disabled. Many of the codes use the defined term 'access (to)' or 'ready access (to)' for access by maintenance and service personnel or fire departments. This proposal provides clarity and consistency in the remaining codes where those coordination modifications missed or came in as part of new code changes.
This a correlation piece for proposals over the last couple of cycles. This effort was started by the CACs in 2015/16 code change cycle, and continued in 2018/19. This proposal is to provide coordination with the action taken with -P84-15, M2-15, RB2-16, F12-16, CE137-16 Part 1, CE29-19 Part 1 and 2 . G1-21 Part 1 was disapproved; however Part 2 through 7 were approved.
Correlative pieces will be entered in Group B for parts of IRC, IPMC, IZC and IECC.

This proposal is submitted by the ICC Building Code Action Committee (BCAC), the ICC Fire Code Action Committee (FCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Insert FCAC paragraph

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a coordination of terms with no changes to construction requirements. See reason statement for additional information on coordination with previous proposals.

E1-24 Part V

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
2024 International Residential Code

P2903.10.1 Service valve. Each *dwelling unit* shall be provided with a *main* shutoff valve, provided with access and located near the

P2903.10.1 Service valve. Each *dwelling unit* shall be provided with a *main* shutoff valve, provided with access and located near the entrance of the water service. The valve shall be of a full-open type having nominal restriction to flow, with provision for drainage such as a bleed orifice or installation of a separate drain valve. Additionally, the water service shall be valved at the curb or *lot line* in accordance with local requirements.

P2903.11 Hose bibb. Hose bibbs subject to freezing, including the "frostproof" type, shall be equipped with a stop-and-waste-type valve located inside the *building* and provided with access so that they can be controlled and drained during cold periods.

Exception: Frostproof hose bibbs installed such that the stem extends through the building insulation into an open heated or *semiconditioned space* need not be separately valved (see Figure P2903.11).

Committee Reason: The committee voted 10-0 to approve Grove-MP1's modified proposal. The final vote is 10-0, as modified. The revised code language clarifies the original suggested code language to reduce any possibility of misunderstanding the intent of the code section.

E1-24 Part V

E3-24

IBC: 1003.3.1, 1003.4; IFC: [BE] 1003.3.1, [BE] 1003.4

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1003.3.1 Headroom. Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any *circulation paths*, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a ~~*means of egress*~~ circulation path shall be reduced in height by protruding objects. **Exception:** Door closers, *overhead doorstops*, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.A barrier shall be provided where the vertical clearance above a *circulation path* is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

1003.4 Slip-resistant surface. *Circulation paths* ~~of the *means of egress*~~ shall have a slip-resistant surface and be securely attached.

2024 International Fire Code

Revise as follows:

[BE] 1003.3.1 Headroom. Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any circulation paths, including walks, *corridors*, *aisles* and passageways. Not more than 50 percent of the ceiling area of a ~~*means of egress*~~ circulation path shall be reduced in height by protruding objects. **Exception:** Door closers, overhead doorstops, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

[BE] 1003.4 Slip-resistant surface. Circulation paths ~~of the *means of egress*~~ shall have a slip-resistant surface and be securely attached.

Reason: Section 1003 applies to all parts of the *means of egress* system.

- In IBC/IFC 1003.3 “*circulation path*” is not followed by “of the *means of egress*”.
- In IBC/IFC 1003.4 “*circulation path*” is followed by “of the *means of egress*”.

The inclusion of “of the *means of egress*” in one, but not the other, gives the unintended mistaken interpretation that the provisions of section 1003.3 apply to all circulation paths and the provisions of section 1003.4 applies only circulations paths of the means of egress.

This proposal is primarily editorial and to remove the possibility of misinterpretation.

Please refer to the definition of 'circulation path'. The term is also used in Sections 1003.3 and 1003.3.3.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial clarification for circulation paths. There are not change to construction requirements.

E3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved because the change in verbiage could be interpreted to broaden this requirement from means of egress to all parts of the building, such as catwalks and tunnel. (Vote: 8-6)

E3-24

Individual Consideration Agenda

Comment 1:

IBC: 1003.3, 1003.3.1, 1003.3.3, 1003.4; IFC: [BE] 1003.3, [BE] 1003.3.1, [BE] 1003.3.3, [BE] 1003.4

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Submitted

Reason: The committee had concerns that removing “of the means of egress” would change the scope of 1003.3 and 1003.4. IBC 1001.1 defines the scope of these two, so the deletion “of the means of egress” would not change the scope.

> **1001.1 General.** Buildings or portions thereof shall be provided with a means of egress system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of means of egress components required to provide an approved means of egress from structures and portions thereof.

Consideration was given to adding “of the means of egress” where missing; however, that only pushes the proverbial can down the road. If someone submitted a code change and did not say “of the means of egress” immediately following circulation paths, the issue today would present. Catwalks and similar areas are considered part of the means of egress for occupants working in those areas (see Section 410.5.3.4 as an example). Tunnels are commonly used as means of egress in underground structures such as subways, parking garages, or underground shelters. In these cases, tunnels provide a designated route for individuals to safely evacuate the building or structure during an emergency.

This proposal is editorial, has no technical effects, and removes the possibility of misinterpretation, currently and in the future.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 126

E8-24

IBC: TABLE 1004.5, 1004.8 (New); IFC: [BE] TABLE 1004.5, 1004.9 (New)

Proposed Change as Submitted

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Automated fabricaion and manufacturing areas	See Section 1004.9
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Automated fabrication and manufacturing areas. The *occupant load* factor for Group H-5 automated fabrication and manufacturing areas with a lower density of occupants than would normally be expected in a typical Group H-5 occupancy environment shall be applied to such areas. Where *approved* by the *building official*, the *occupant load* for automated fabrication and manufacturing areas shall be the actual *occupant load*, but not less than one occupant per 300 square feet (27.87 m^2) of gross occupiable floor space.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Automated fabricaion and manufacturing areas	See Section 1004.9
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Automated fabrication and manufacturing areas. The *occupant load* factor for Group H-5 automated fabrication and manufacturing areas with a lower density of occupants than would normally be expected in a typical Group H-5occupancy environment shall be applied to such areas. Where *approved* by the *building official*, the *occupant load* for automated fabrication and manufacturing areas shall be the actual *occupant load*, but not less than one occupant per 300 square feet (27.87 m^2) of gross occupiable floor space.

Reason: As the manufacturing of semiconductors is becoming increasingly automated, there are few personnel in the fabrication and manufacturing areas. Similar to what is done for other occupancies, the proposed language provides the code official with the ability to approve an occupant load determination that uses a concentration of something less than 1 person per 200 sq. ft, with a limit that the concentration cannot be less than 1 person per 300 sq. ft.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

While reducing the occupant load itself does not reduce construction cost, the associated code requirements for egress capacity, plumbing fixtures, etc. could result in a decrease in the cost of construction.

E8-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. What about automated facilities other than Group H-5? Is this not already permitted in the exception to Section 1004.4? 300 square feet per occupant might not be an accurate number for all facilities - this appears to take away options. Why can this not just be addressed in the occupant load table? The first sentence in the new section is unclear - it needs to be broken up. (Vote: 9-5)

E8-24

Individual Consideration Agenda

Comment 1:

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com) requests As Submitted

Reason: The Committee raised a few concerns when this item was Disapproved by a vote of 9-5.**What about automated facilities other than Group H-5?** This is a legitimate question to ask but we have not included other automated facilities because our data is unique to

semiconductor manufacturing facilities.**Is this not already permitted by Section 1004.4?** Yes, the Exception to Section 1004.5 does allow the code official to allow an occupant load lower than that calculated using the occupant load factor in Table 1004.5. However, that requires a determination made by the code official on a project specific basis. Our data indicates that the proposed occupant load is relevant to most newer projects with automated manufacturing. Note that should the occupant load be greater than calculated using 1 person per 300 sq. ft., Section 1004.5.1 addresses the increased occupant load. It should also be noted that the Exception to Section 1004.5 provides no recommended value to be used, which could be too open ended resulting in significant inconsistencies regarding enforcement.**Why not just put the occupant load in the table?** We chose a format similar to existing Section 1004.8. If the 1 person per 300 sq. ft. is inserted in the table, there is no analysis to indicate that the density is lower than commonly found in other fabs and there would be no review process by the code official. **The first sentence is unclear.** As noted above, we chose a format similar to existing Section 1004.8.In summary, we do not simply support a line in the table that provides an occupant load of 1 person per 300 sq. ft. for any semiconductor manufacturing facility that has one or more pieces of automatic equipment. While the exception to Section 1004.5 does using an occupant load factor lower than what is calculated, we believe that due to the frequency that this will occur, a separate occupant load factor is warranted. In other words, we are supporting language that is between an automatic allowance to use 1 person per 300 sq. ft. and the existing language that would allow it, but is silent on the conditions and what would be a reasonable occupant load factor.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 654

E10-24

IBC: TABLE 1004.5; IFC: [BE] TABLE 1004.5

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
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Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Motor Vehicle Repair Garages	
Commercial Motor Vehicle (CMV)	500 gross
Non CMV	200 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Exercise rooms	50 gross
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Motor Vehicle Repair Garages	
Commercial Motor Vehicle (CMV)	500 gross
Non CMV	200 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Reason: Most motor vehicle repair garages will never have an occupant load as high as one would be calculated for by using the

industrial occupant load factor of 100 gross square feet per person. On average, most vehicle repair garages will average closer to 500 square feet per person in terms of actual employees on a given shift. Even if a change in shifts is occurring, the occupant load would still not be anywhere near the 100 square feet per person load factor. What I have tried to provide is two different load factors, as commercial vehicles will take up much more space in a repair garage than the typical passenger vehicles. The term "Commercial Motor Vehicle (CMV)" is a term recognized by the Department of Transportation and applies to vehicles whose weight is more than 10,000 pounds. All other vehicles would then be non-CMV, which would include passenger vehicles. The smaller proposed occupant load factor would apply to these facilities. This would recognize there is more space available for smaller vehicles and thus the potential for an increased occupant load. While this proposed occupant load factor for the CMV is the same as a warehouse, I did not want to add this to the warehouse classification as that should stand on its own.

To give an example, we have a client that builds truck repair garages for CMV's across the country. On average, one of their facilities will be 14,000 square feet. At any given point during the day, the most workers they will have in the building is ten, which would yield an occupant load factor of 1,400, which is not reasonable. By the time one takes into account the space the equipment occupies, the 500 square feet per person is a reasonable occupant load factor for this specific application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

If anything this would reduce costs as the number of occupants would reduce the number of plumbing fixtures required.

E10-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: A definition for commercial motor vehicles should be added into the code so that this can be uniformly enforced across jurisdictions. There was not justification provided for the occupant load factor for non-CMV areas. What would non-CMV areas include? If aircraft hangers have occupant load factors of 300 sq.ft., the 500 sq.ft. occupant load factor seems high. (Vote: 9-5)

E10-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202 (New); IFC: SECTION 202 (New)

Proponents: Eirene Knott, BRR Architecture, BRR Architecture (eirene.knott@brrarch.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Add new definition as follows:

COMMERCIAL MOTOR VEHICLE. Any motor vehicle used on a highway in interstate commerce to transport property or passengers when the vehicle has a gross vehicle weight rating of 10,001 pounds or more.

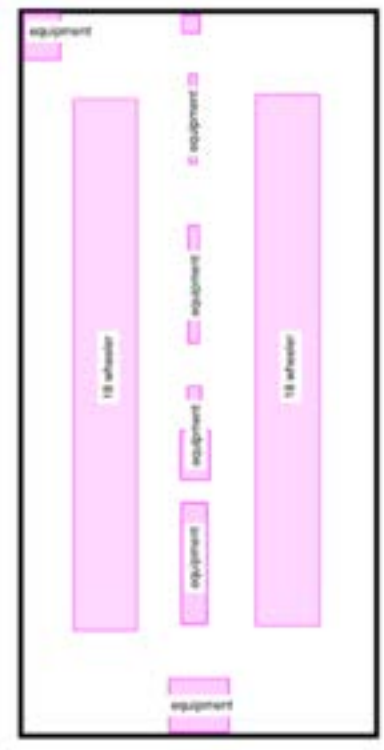
2024 International Fire Code

Add new definition as follows:

COMMERCIAL MOTOR VEHICLE. Any motor vehicle used on a highway in interstate commerce to transport property or passengers when the vehicle has a gross vehicle weight rating of 10,001 pounds or more.

Reason: The committee asked for a definition of commercial motor vehicle, which I have included. This comes from the USDOT. I stand by my original proposal request of 500 square feet per person for a commercial motor vehicle repair garage. In my original reason statement I indicated that we have a client that builds commercial vehicle repair garages. In the attached illustration, I have provided a two bay repair garage which is approximately 4800 square feet. The items in color represent either the trucks themselves being repaired or equipment within the garage utilized for servicing the trucks. After subtracting these areas, which occupy approximately 1500 square feet, we're left with approximately 3,300 square feet. Using the current provisions of 100 square feet per person, this will yield an occupant load of 33 people. I'm not sure where 33 people would fit unless they're on top of each other. Using the proposed load of 500 square feet per person, we get an occupant load of 7, which based on client information is about how many people will actually be in this space. If we take this one step further and use the proposed load by the committee of 300 square feet per person, we get an occupant load of 11.

There needs to be a distinction between a commercial vehicle garage and a non-commercial vehicle garage in terms of occupant loads as the commercial garage will have much larger equipment and the vehicles themselves take up more space. An average 18 wheeler truck is 72 feet in length, 8.5 feet in width and 13.5 feet in height, which yields about 612 square feet. If we assume an average pickup truck is 20 feet in length and 7 feet in width, that's only 140 square feet so approximately one-fourth the size of the commercial truck. Even with some of the equipment used on passenger vehicles, the 100 square foot per person is not realistic, which is why I proposed the 200 for the passenger vehicles and 500 for the commercial.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

If anything this would reduce costs as the number of occupants would reduce the number of plumbing fixtures required. (same notation as original proposal)

Comment (CAH2)# 42

E15-24

IBC: 1005.3, 1030.6; IFC: [BE] 1005.3, [BE] 1030.6

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of the *means of egress* for any room, area, space or *story* shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

1030.6 Capacity of aisle for assembly. The required capacity of aisles shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, Section 1030.6.2 where *smoke-protected assembly seating* is provided and Section 1030.6.3 where *open-air assembly seating* is provided.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

2024 International Fire Code

Revise as follows:

[BE] 1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of the *means of egress* for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

[BE] 1030.6 Capacity of aisle for assembly. The required capacity of *aisles* shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, with Section 1030.6.2 where *smoke-protected assembly seating* is provided, and with Section 1030.6.3 where open-air assembly seating is provided.
The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:

1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.

Reason: E106-18 added criteria to 1030.16 to address social stairways.

“Where stepped aisles have seating on one side and the aisle width is 74 inches (1880 mm) or greater, two handrails are required.

Where two handrails are required, one of the handrails shall be within 30 inches (762 mm) horizontally of the stepped aisle."

The question at this point is where there is this type assembly seating immediately adjacent to the egress from the upper floor – how should the capacity of the combined stairway/stepped aisle be calculated? We feel that the proposed language would clarify this issue.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements to calculate width for the stairway/stepped aisle. There are no change to construction requirements.

E15-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The intent is good, but there are some additional clean ups needed. This might be better located in a subsection. The terminology mixes 'required capacity' and occupant load - this needs to be separated. There should be a pointer in one of the sections to reduce duplication. (Vote: 13-1)

E15-24

Individual Consideration Agenda

Comment 1:

IBC: 1005.3, 1005.3.1, 1005.3.1.1 (New), 1005.3.2, 1030.6, 1003.6.4 (New); IFC: [BE] 1005.3, [BE] 1005.3.1, [BE]1005.3.1.1 (New), [BE] 1005.3.2, [BE] 1030.6, [BE] 1003.6.4 (New)

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of the *means of egress* for any room, area, space or *story* shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2. Stepped aisles adjacent to tiered platforms used as seating shall comply with Section 1005.3.3. ~~The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:~~

~~1. The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.~~

~~2. The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.~~

1005.3.1 Stairways. The capacity, in inches, of means of egress *stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a *means of egress* capacity factor of 0.3 inch (7.6 mm) per occupant. Where *stairways* serve more than one *story*, only the *occupant load* of each *story* considered individually shall be used in calculating the required capacity of the *stairways* serving that *story*. **Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of means of egress *stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant in *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an *emergency voice/alarm communication system* in accordance with Section 907.5.2.2.
2. *Facilities* with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1030.6.2 indicated for stepped *aisles* for *exit access* or exit *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. *Facilities* with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for stepped *aisles* for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

Add new text as follows:

1005.3.1.1 Stepped aisles for tiered platforms used as seating. The capacity, in inches, of the means of egress stairways between

stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall comply with Section 1030.6.1.

1005.3.2 Other egress components. The capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant.

Exceptions:

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a means of egress capacity factor of 0.15 inch (3.8 mm) per occupant in *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. *Facilities* with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1030.6.2 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. *Facilities* with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

1030.6 Capacity of aisle for assembly. The required capacity of aisles shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, Section 1030.6.2 where *smoke-protected assembly seating* is provided, ~~and~~ Section 1030.6.3 where *open-air assembly seating* is provided and Section 1030.6.4 where tiered platforms used as seating is provided.

~~The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:~~

1. ~~The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.~~
2. ~~The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.~~

Add new text as follows:

1003.6.4 Stepped aisles for tiered platforms used as seating. The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of the following:

1. The capacity, in inches, of the means of egress stairway from the story or mezzanine in accordance with Sections 1005.3.1.
2. The capacity, in inches, as determined by the occupant load of the tiered platforms used for seating in accordance with Section 1030.6.1, 1030.6.2, or 1030.6.3, as applicable.

2024 International Fire Code

[BE] 1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of the *means of egress* for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2. Stepped aisles adjacent to tiered platforms used as seating shall comply with Section 1005.3.3.

~~The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:~~

1. ~~The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.~~
2. ~~The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.~~

[BE] 1005.3.1 Stairways. The capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a means of egress capacity factor of 0.3 inch (7.6 mm) per occupant. Where *stairways* serve more than one

story, only the *occupant load* of each story considered individually shall be used in calculating the required capacity of the *stairways* serving that story. **Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress stairways* shall be calculated by multiplying the *occupant load* served by such *stairways* by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with *smoke-protected assembly seating* shall be permitted to use the capacity factors in Table 1030.6.2 indicated for stepped *aisles* for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. Facilities with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for stepped *aisles* for *exit access* or *exit stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

Add new text as follows:

[BE]1005.3.1.1 Stepped aisles for tiered platforms used as seating. The capacity, in inches, of the means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall comply with Section 1030.6.1.

[BE] 1005.3.2 Other egress components. The capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.2 inch (5.1 mm) per occupant. **Exceptions:**

1. For other than Group H and I-2 occupancies, the capacity, in inches, of *means of egress* components other than *stairways* shall be calculated by multiplying the *occupant load* served by such component by a *means of egress* capacity factor of 0.15 inch (3.8 mm) per occupant in buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with *smoke-protected assembly* seating shall be permitted to use the capacity factors in Table 1030.6.2indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is provided with a smoke control system complying with Section 909.
3. Facilities with *open-air assembly seating* shall be permitted to the capacity factors in Section 1030.6.3 indicated for level or ramped *aisles* for *means of egress* components other than *stairways* where the entire path for *means of egress* from the seating to the *exit discharge* is open to the outdoors.

[BE] 1030.6 Capacity of aisle for assembly. The required capacity of *aisles* shall be not less than that determined in accordance with Section 1030.6.1 where *smoke-protected assembly seating* is not provided, with Section 1030.6.2 where *smoke-protected assembly seating* is provided, ~~and~~ Section 1030.6.3 where *open-air assembly seating* is provided and Section 1030.6.4 where tiered platforms used as seating is provided.

~~The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of both of the following:~~

1. ~~The occupant load served by the stairway from the story or mezzanine in accordance with Sections 1005.3.1.~~
2. ~~The occupant load of the tiered platforms used for seating determined in accordance with Section 1030.6.~~

Add new text as follows:

[BE] 1003.6.4 Stepped aisles for tiered platforms used as seating. The capacity, in inches, of means of egress stairways between stories or mezzanines that also serve as a stepped aisle for tiered platforms used for seating shall be the aggregate of the following:

1. The capacity, in inches, of the means of egress stairway from the story or mezzanine in accordance with Sections 1005.3.1.

2. The capacity, in inches, as determined by the occupant load of the tiered platforms used for seating in accordance with Section 1030.6.1, 1030.6.2, or 1030.6.3, as applicable..

Reason: The intent of this proposal remains the same (see original reason). The modifications were made to address the committee comments.

In response to the Committee's comment that this would be better in its own subsection, subsection 1030.6.4 was created, with a pointer being added in a new subsection 1005.3.1.1. While either location would be acceptable, 1030.6 was chosen on the belief that a user may start in Section 1030 when designing a social stairway.

To address the committee's concerns about the mixing of terminology, Section 1030.6.4, Items 1 and 2 were re-written slightly to better address that the minimum width of the stairway is the aggregate of widths as determined by the two conditions.

Throughout the means of egress sections, the minimum size of egress components is stated with the phrase "capacity, in inches". It was used in this proposal to keep the text consistent with the remainder of the established means of egress sections. See Section 1005.3, 1005.3.1, 1005.3.2, 1030.6.1, 1030.6.2 and 1030.6.3 for examples of this phrase in current text. If it was the committees desire for that phrasing to be addressed in some way throughout the code, BCAC would happily consider it in a proposal for next cycle, but changing here it is beyond the intent and scope of this proposal.

Example:

200 occupants egressing on the stairway from the 2nd floor and 150 occupants on the tiered platforms in a college student union.

(200 occupants x 0.3") + (150 occupants x 0.3") = 60" + 45" = a minimum stairway width of 105"

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements to calculate width for the stairway/stepped aisle. There are no change to construction requirements.

Comment (CAH2)# 127

E18-24

IBC: 1006.2.2.5; IFC: [BE] 1006.2.2.5

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1006.2.2.5 Vehicular ramps. Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* ~~unless pedestrian *facilities* are~~ except where a walkway used exclusively as a pedestrian trafficway is provided.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.2.5 Vehicular ramps. Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* ~~unless pedestrian *facilities* are~~ except where a walkway used exclusively as a pedestrian trafficway is provided.

Reason: Are vehicular ramps the driveways and crossovers for cars only with no parking on either side; or are they wherever a car drives in a parking garage. Pedestrian walkways are used for bridges between buildings in Chapter 31, so we did not want to use the defined term, but the words in the defined term would add clarity to this requirement. The term “pedestrian facilities” is not defined and is not clear.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for pedestrians on vehicular ramps. There are no changes to construction requirements.

E18-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The change adds confusion. Does a pedestrian trafficway require a sidewalk or barriers along the vehicle ramp? If you have a pedestrian route, this is not longer a "vehicular ramp only for vehicle traffic." (Vote: 14-0)

E18-24

Individual Consideration Agenda

Comment 1:

IBC: 1006.2.2.5; IFC: [BE] 1006.2.2.5

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1006.2.2.5 Vehicular ramps. Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* except where a demarcated walkway used exclusively ~~as a~~ for pedestrian traffic ~~way~~ is provided.

2024 International Fire Code

[BE] 1006.2.2.5 Vehicular ramps. Vehicular ramps intended only for vehicle traffic shall not be considered as an *exit access ramp* except where a demarcated walkway used exclusively ~~as a~~ for pedestrian traffic ~~way~~ is provided.

Reason: The modifications are intended to address the committee's concerns.

Vehicular ramps are driveways and crossovers for cars only with no parking on either side; they are not sloped surfaces between parking where vehicles enter or exit spaces. Typically pedestrians are not using these entrance ramps. The allowance is for emergency egress if needed.

The requirement for the walkway to be **demarcated** is added to clarify the need for separation but leaves the method of such separation open (barriers, marking, sidewalks, curbs, etc.). The term demarcated is already used in 1016.2 (item 6, exception 2).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for pedestrians on vehicular ramps. There are no changes to construction requirements.

Comment (CAH2)# 128

E19-24

IBC: 1006.2.2, 1006.2.2.7 (New); IFC: [BE] 1006.2.2, 1006.2.2.7 (New)

Proposed Change as Submitted

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov)

2024 International Building Code

Revise as follows:

1006.2.2 Egress based on use. The numbers, configuration and types of components of *exits* or access to *exits* shall be provided in the uses described in Sections 1006.2.2.1 through ~~1006.2.2.6~~ 1006.2.2.7.

Add new text as follows:

1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4) of the *International Fire Code*, shall have at least two exits or exit access doorways.

Exception: Equipment platforms with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m) shall be permitted to have a single exit or exit access doorway.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.2 Egress based on use. The numbers, configurations, and types of components of exits or access to exits shall be provided in the uses described in Sections 1006.2.2.1 through ~~1006.2.2.6~~ 1006.2.2.7

Add new text as follows:

1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4), shall have at least two exits or exit access doorways.

Exception: Equipment platforms with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m) shall be permitted to have a single exit or exit access doorway.

Reason: On November 13, 2020, hydrogen chloride gas, which is corrosive and toxic, was released from an industrial chemical process at the Wacker Polysilicon North America (Wacker) facility in Charleston, TN. The release occurred when excessive torque was applied to the bolts of the graphite heat exchanger in the unit. The release occurred on the fifth floor of an equipment platform located outdoors. At the time of the release, there were seven workers on the fifth floor of the equipment platform some in chemical resistant suits and others not.

Four of the workers remained in place during the release. Three of the workers who were not wearing chemical resistant suits attempted to escape by climbing over the edge of the equipment platform approximately 70 feet above the ground and climbing down piping on the side of the structure. During the climb down all three workers fell fatally injuring one and seriously injuring the other two. One of the employees who remained in place suffered chemical burns when their chemical resistant suit ripped. In addition to the human toll of this incident damages of $214,000 were reported by the facility.

Access to/egress from the fourth and fifth floors of the equipment platform was provided by a single staircase. The release cut off the employees from the staircase. In the months immediately preceding the incident Wacker identified this area having a single means of egress as a hazard during a process hazard analysis. At the time of the incident, Wacker had not followed up on this PHA recommendation. In response to concerns brought by employees Wacker cited IBC/IFC as justification for the arrangement of the

platform's means of egress.

During its investigation the CSB concluded that had an additional means of egress been installed that the workers affected by the release would not have had to climb over the edge of the platform to escape the release and the fatality and serious injuries associated with the falls could have been prevented. The CSB also concludes that current egress requirements, including those found in the IBC/IFC, are insufficient for equipment platforms used for accessing equipment containing hazardous materials.

As part of its investigation into this incident, the CSB reviewed the requirements of the International Building Code (IBC) and the International Fire Code (IFC) and determined that there are no requirements for means of egress from equipment platforms even those serving equipment with hazardous materials under any circumstances.

As the result of the investigation, the CSB issued the following recommendation to the International Code Council:

CSB Recommendation No. 2021-01-I-TN-R9

Amend the International Building Code (IBC) to address conditions that may require multiple means of egress from elevated equipment platforms used for accessing equipment containing materials that pose physical and health hazards, such as the one used at Wacker in this incident. Specify the minimum number of egress points to increase the likelihood of worker escape in the event of a hazardous material release.

The language proposed is intended to satisfactorily implement this recommendation.

Bibliography: U.S. Chemical Safety and Hazard Investigation Board (CSB), "Equipment Fracture and Fatal Hydrogen Chloride Release at Wacker Polysilicon North America," 15 June 2023. [Online]. Available: https://www.csb.gov/file.aspx?DocumentId=6226. [Accessed 30 November 2023].

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Between $17,000 and $362,000

Estimated Immediate Cost Impact Justification (methodology and variables):

Recent projects to increase the number of means of egress on elevated equipment platforms were completed, or are underway, at a chemical plant in Tennessee. Addressing the following scenarios resulted in the following final and estimated costs.

Scenario 1: A piece of equipment is kept on the third floor, near the edge of the platform.

Solution:

Ladders were added on each side of the building from the third floor to an adjacent building. Modifications were also made to the rood access door.

Final Cost: $17,000

Scenario 2: The existing finger rack dead-ends.

Solution:

A ladder and platform were installed to connect the finger rack to the adjacent pipe rack.

Final Cost: $24,000

Scenario 3: The existing finger rack dead-end on either side of a process vessel.

Solution:

Ladders and platforms were added on each of the finger racks.

Final Cost: $147,000

Scenario 4: Material from a third-floor skid is piped through upper floors and is located in various vessels on the upper floors. Maintenance and operations personnel frequently access these areas and there is a single means of egress.

Solution:

Ladders are being added from the 6^{th} to 5^{th} floors, 5^{th} to 4^{th} floors, and 4^{th} floor to the roof of the adjacent building.

Estimated Cost: $175,000

Scenario 5: Chemical process equipment is located on the fifth floor of an elevated equipment platform with a single means of egress.

Solution:

A stair tower serving each floor of the elevated equipment platform was constructed.

Final Cost: $362,000

Cost Source:

This information was provided by the chemical company previously mentioned based on their efforts to install secondary means of egress on the existing elevated equipment platforms located throughout their facility. The cost of these items for new construction will likely be less expensive if secondary means of egress for these structures is considered in their original design.

E19-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There were several questions about the proposal. Does this apply to equipment platforms inside and outside a building? How would you determine the occupant load of an equipment platform when this space is defined as non-occupied. How would a code official determine and occupant load where there is no occupant load in the table? Would ladders be permitted as a exit - they are permitted in Section 505.3? What is the justification for the size limits? Should there be separation requirements for the two exits? (Vote: 14-0)

E19-24

Individual Consideration Agenda

Comment 1:

IBC: 1006.2.2.7; IFC: 1006.2.2.7

Proponents: Adam Henson, U.S. Chemical Safety and Hazard Investigation Board (adam.henson@csb.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4) of the *International Fire Code,* shall have ~~at least~~ not less than two exits, ~~or~~ exit access doorways, or exit access stairways. The requirements of this section are permitted to be met by the installation of one or more fixed ladders or alternating tread devices.

Exception: Equipment platforms less than 20 feet (6.1 m) above the lower level ~~with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m)~~ shall be permitted to have a single exit, ~~or~~ exit access doorway, or exit access stairway.

2024 International Fire Code

Revise as follows:

[BE] 1006.2.2.7 Equipment Platforms. Equipment platforms in Group H-1, H-2, H-3 and H-4 occupancies, and equipment platforms located outside servicing industrial processes, storing or using hazardous materials in excess of the maximum allowable quantity per control area specified in Tables 5003.1.1 (3) or 5003.1.1(4), shall have ~~at least~~ not less than two exits, ~~or~~ exit access doorways, or exit access stairways. The requirements of this section are permitted to be met by the installation of one or more fixed ladders or alternating tread devices.

Exception: Equipment platforms less than 20 feet (6.1 m) above the lower level ~~with less than 4 occupants and with an exit access travel distance less than 200 feet (61 m)~~ shall be permitted to have a single exit, ~~or~~ exit access doorway, or exit access stairway.

Reason: This proposal has been updated in an attempt to address the concerns shared by the committee at CAH #1. The proposal does apply to platforms inside and outside of buildings as addressed by the first sentence of 1006.2.2.7 of updated the proposal. The reference in the exception necessitating the calculation of the occupant load of the platforms has been replaced with an exception based on the height of the equipment platform. The height chosen is based on a research paper titled: *Falls from Great Heights: Risk to Sustain Severe Thoracic and Pelvic Injuries Increases with Height of Fall*. This paper was published June 10, 2021 and is available through the U.S. National Library of Medicine. According to this paper researchers have described a fall from a height of at least 20 feet (6.1 M) as the threshold for suffering major trauma. NIOSH published a paper in 1975 calling for every elevated work surface servicing a hazardous process to have two means of egress, but the exception as proposed seems necessary and appropriate. This information is located in Section 3 of the document. Yes, ladders would be acceptable to meet these requirements. Alternating tread devices would also suffice. There is nothing in the proposal seeking to limit the size of equipment platforms. The reference to travel distance in the original proposal was not intended to limit the size of the platform, but rather to denote equipment platforms that would be excepted from the proposal's requirements because of their small size. The distance was from NFPA 101 Section 11.2 Open Structures. A requirement for separation similar to the one found for Refrigeration Machinery Rooms (1006.2.2.2). The entire proposal is meant to mirror the existing egress requirements for boiler rooms, refrigeration machinery rooms, and others in the Egress Based on Use Section of the IBC/IFC (1006.2.2) because of the similarity between these spaces and how they are used. The definition of equipment platforms identifies them as unoccupied. The definition of floor area, net identifies mechanical rooms, such as boiler rooms and refrigeration mechanical rooms, as unoccupied accessory areas. They should be treated the same.

Bibliography:

1. Nau C, Leiblein M, Verboket RD, Hörauf JA, Sturm R, Marzi I, Störmann P. Falls from Great Heights: Risk to Sustain Severe Thoracic and Pelvic Injuries Increases with Height of the Fall. J Clin Med. 2021 May 25;10(11):2307. doi: 10.3390/jcm10112307. PMID: 34070640; PMCID: PMC8199183. Viewed at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8199183/
2. National Insttitue of Occupational Safety and Health. (1975). *Criteria for a Recommended Standard.... Emergency Egress From Elevated Workstations*. Retrieved from https://www.cdc.gov/niosh/docs/76-128/default.html

Cost Impact: Increase

Estimated Immediate Cost Impact:

Between $17,000 and $362,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Recent projects to increase the number of means of egress on elevated equipment platforms were completed, or are underway, at a chemical plant in Tennessee. Addressing the following scenarios resulted in the following final and estimated costs.

Scenario 1: A piece of equipment is kept on the third floor, near the edge of the platform.
Solution:
Ladders were added on each side of the building from the third floor to an adjacent building. Modifications were also made to the rood access door.
Final Cost: $17,000

Scenario 2: The existing finger rack dead-ends.
Solution:
A ladder and platform were installed to connect the finger rack to the adjacent pipe rack.
Final Cost: $24,000

Scenario 3: The existing finger rack dead-end on either side of a process vessel.
Solution:
Ladders and platforms were added on each of the finger racks.
Final Cost: $147,000

Scenario 4: Material from a third-floor skid is piped through upper floors and is located in various vessels on the upper floors. Maintenance and operations personnel frequently access these areas and there is a single means of egress.
Solution:
Ladders are being added from the 6 to 5 floors, 5 to 4 floors, and 4 floor to the roof of the adjacent building.
Estimated Cost: $175,000

Scenario 5: Chemical process equipment is located on the fifth floor of an elevated equipment platform with a single means of egress.
Solution:
A stair tower serving each floor of the elevated equipment platform was constructed.
Final Cost: $362,000

Cost Source:
This information was provided by the chemical company previously mentioned based on their efforts to install secondary means of egress on the existing elevated equipment platforms located throughout their facility. The cost of these items for new construction will likely be less expensive if secondary means of egress for these structures is considered in their original design.

Comment (CAH2)# 523

E22-24

IBC: TABLE 1006.3.4(1), TABLE 1006.3.4(2); IFC: [BE] TABLE 1006.3.4(1), [BE] TABLE 1006.3.4(2)

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3, and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3, and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

2024 International Fire Code

[BE] 1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.
   5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit*'s entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, or 903.3.1.2 or 903.3.1.3 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, ~~or~~ 903.3.1.2 or 903.3.1.3 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

Reason: A townhouse can be a Group R-2 and be permitted to use an NFPA13D sprinkler system. Footnote a of Table 1006.3.4(1) and 1006.3.4(2) should include a requirement for townhouses with a single exit to have emergency escape and rescue openings consistent with Group R-2 with an NFPA 13 or NFPA 13R systems.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned

International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E22-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Is a NFPA13D permitted in a townhouse? It needs to be clarified that a NFPA13D system is limited to three story units so it will not be interpreted to be allowed in taller Group R-2 dwelling units. Is a NFPA13D system permitted in a Group R-2 with sleeping units? (Vote: 12-2)

E22-24

Individual Consideration Agenda

Comment 1:

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Submitted

Reason: BCAC had 5 different proposals dealing with requirements for buildings where an NFPA13D sprinkler system is permitted. Proposal FS94-24, E16-24 and E95-24 were approved. We are asking for approval of code changes E22-24 and E93-24 for consistency within the code.

In these tables, by not listing and NFPA13D system, it could be interpreted that emergency escape windows are not required. Since emergency escape windows would be required for a building with an NFPA13 or NFPA13R system, this is not consistent and is a safety issue.

Much of the discussion with the committee was about where an NFPA13D system can be used. That is outside the scope of these proposals. However, Code change F100-24 was approved as modified to clarify where an NFPA13D system can be use. This is the approved text.

2024 International Fire/Building Code
Revise as follows:
903.2.8 Group R. An automatic sprinkler system installed in accordance with Section 903.3.1 shall be provided throughout all buildings with a Group R fire area.
Delete without substitution:
~~903.2.8.1 Group R-3. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~
~~903.2.8.2 Group R-4, Condition 1. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~
~~903.2.8.3 Care facilities. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities~~

~~with five or fewer individuals in a single-family dwelling.~~

Revise as follows:

903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one- and two-family dwellings and townhouses; Group R-3; and Group R-4~~, Condition 1; and townhouses~~ shall be permitted to be installed throughout in accordance with NFPA13D.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 140

E23-24

IBC: TABLE 1006.3.4(1), TABLE 1006.3.4(2), 1006.3.4.1, 1031.2; IFC: [BE] TABLE 1006.3.4(1), [BE] TABLE 1006.3.4(2), [BE] 1006.3.4.1, [BE] 1031.2

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES [a,b]

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER ~~OF DWELLING UNITS~~	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2~~[a, b, c]~~ consisting of dwelling units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

~~b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).~~

~~c.~~ b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling units or sleeping units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B~~[a][b]~~, E, F~~[a]~~, M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1~~, R-2[a, c]~~	10	75
	S~~[a][b, d]~~	29	75
Second story above grade plane	B, F, M, S~~[b][d]~~	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

~~a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.~~

~~b.~~ a. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

~~c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).~~

~~d.~~ b. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to exits at other *stories*, is permitted to serve individual *stories*, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(1) for Group R-2 sleeping units or Table 1006.3.4(2) for each occupancy does not exceed one. Where Group R-2 *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by ~~Tables~~ Table 1006.3.4(1) ~~and 1006.3.4(2)~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.

3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

2024 International Fire Code

[BE] 1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and *exit access* travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one means of egress.
   5.2. Either the *exit* from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit* access outside the *dwelling unit*'s entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES a,b

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER ~~OF DWELLING UNITS~~	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2~~a, b, c~~ consisting of dwellint units	4 dwelling units	125 feet
	R-2 consisting of sleeping units	20 occupants	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

~~b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).~~

~~c.~~ b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling or sleeping units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B~~[a,b]~~, E, F~~[a,b]~~, M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, ~~R-1, R-2[a, c]~~	10	75
	S~~[a, b, d]~~	29	75
Second story above grade plane	B, F, M, S~~[b,d]~~	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

~~a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.~~

~~b.~~ a. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

~~c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).~~

~~d.~~ b. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants ~~of the~~ indicated in Table 1006.3.4(1) for Group R-2 sleeping units or Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of Group R-2 *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by ~~Tables~~ Table 1006.3.4(1) ~~and 1006.3.4(2)~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue*

opening in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: The purpose of this code change is to coordinate and consolidate requirements for R-2 units in Tables 1006.2.1 (single exit space), 1006.3.4(1) and 1006.3.4(2) (singe exit buildings).

Proposal E17-15 increased the maximum occupant load for R-2 Occupancies from 10 to 20 occupants for single exit spaces stating that it's appropriate since Group R-2 occupancies require sprinkler protection per Section 903.3.1.1 or 903.3.1.2. and that the exit access travel distance is 125' in both Table 1006.2.1 and 1006.3.4(1). There is no logic for a unit on the 1st floor of single exit building to have a lower occupant load or a shorter travel distance. In addition, if 4 single exit dwelling units are permitted on the 2nd and 3rd floor of a Group R-2 building, why is a single exit dwelling not permitted at the 2nd floor of a mixed-use building? Please note that emergency escape and rescue openings would be required in the single exit building.The change to Sections 1006.3.4.1 and 1031.2 are editorial to recognize that R-2 is only in one table.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) .

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 - This will eliminate the need for a 2nd exterior door, and will allow for more efficient floor plan design. The options in floor plans is so wide ranging, it is not possible to determine costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will only affect dwelling units on the basement, 1st or 2nd floor of a mixed-use building. This will most likely be no change in units less than 2,000 sq. ft. This will allow for a single exit in some apartments between 2,000 and 4,000 sq. ft., provided they can meet the exit access travel distance and provide EEROs.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Combining the two tables appears to increase the number of sleeping units permitted to have a single exit. The revised table could be read to allow each of the sleeping units to have 20 occupants - there should be a unit count. The title on the third column of 'maximum number' is not clear. (Vote: 8-5)

E23-24

Individual Consideration Agenda

Comment 1:

IBC: TABLE 1006.3.4(1); IFC: [BE] TABLE 1006.3.4(1)

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES [a,b]

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2consisting of dwelling units	4 dwelling units per story	125 feet
	R-2 consisting of sleeping units	20 occupants per story	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling units or sleeping units, use Table 1006.3.4(2).

2024 International Fire Code

Revise as follows:

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES a,b

STORY OR OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM NUMBER	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2consisting of dwellint units	4 dwelling units per story	125 feet
	R-2 consisting of sleeping units	20 occupants per story	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is for occupiable roofs accessed through and serving individual dwelling units or sleeping units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual dwelling or sleeping units, use Table 1006.3.4(2).

Reason: From the report of committee actions- "Committee Reason: Combining the two tables appears to increase the number of sleeping units permitted to have a single exit. The revised table could be read to allow each of the sleeping units to have 20 occupants - there should be a unit count. The title on the third column of 'maximum number' is not clear. (Vote: 8-5)"

The purpose of this code change is to coordinate and consolidate requirements for R-2 units in Tables 1006.2.1 (single exit space), 1006.3.4(1) and 1006.3.4(2) (singe exit buildings).

Proposal E17-15 increased the maximum occupant load for R-2 Occupancies from 10 to 20 occupants for single exit spaces stating that it's appropriate since Group R-2 occupancies require sprinkler protection per Section 903.3.1.1 or 903.3.1.2. and that the exit access travel distance is 125' in both Table 1006.2.1 and 1006.3.4(1). There is no logic for a unit on the 1st floor of single exit building to have a lower occupant load or a shorter travel distance. Whether or not the spaces are dwelling or sleeping units shouldn't impact the allowable travel distance, because in both cases the residents are non-transient and equally familiar with their surroundings. The difference between the two is whether the spaces have both cooking and sanitation facilities, or only one of them. In addition, if 4 single exit dwelling units are permitted on the 2nd and 3rd floor of a Group R-2 building, why is a single exit dwelling not permitted at the 2nd floor of a mixed-use building? Please note that emergency escape and rescue openings would be required in the single exit building. The change to Sections 1006.3.4.1 and 1031.2 are editorial to recognize that R-2 is only in one table.

Regarding the committee's concern that the number of sleeping units should be limited to a certain number, rather than limiting only by number of occupants. Keep in mind that there are other factors that will also limit the overall story size. First, the occupant load calculation from Table 1004.5, where a residential occupancy is calculated at 200 sf per occupant, gross states to reach 20 occupants per story the building would be 4,000 sf in area, which could be 40'x100'; and maximum travel distance still needs to be met to a single exit. Table 1006.2.1 Spaces with One Exit or Exit Access Doorway uses 125-feet for the maximum R-2 travel distance, and that is the value used in the combined table.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - This will eliminate the need for a 2nd exterior door, and will allow for more efficient floor plan design. The options in floor plans is so wide ranging, it is not possible to determine costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will only affect dwelling units on the basement, 1st or 2nd floor of a mixed-use building. This will most likely be no change in units less than 2,000 sq. ft. This will allow for a single exit in some apartments between 2,000 and 4,000 sq. ft., provided they can meet the exit access travel distance and provide EEROs.

Comment (CAH2)# 139

E24-24

IBC: 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.3.5.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1023.12, 1031.2; IFC: [BE] 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.3.5.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), [BE] 1023.12, [BE] 1031.2

Proposed Change as Submitted

Proponents: Stephen Smith, Center for Building in North America, Center for Building in North America (stephen@centerforbuilding.org); Scott Brody, Self (sbrody96@gmail.com); Trevor Acorn, PE SE, Myself (tjacorn@gmail.com)

2024 International Building Code

Revise as follows:

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-2 occupancies complying with Section 1006.3.5.

~~2~~ 3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~ 4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~ 5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~ 6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to exits at other *stories*, is permitted to serve individual *stories*, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.6.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. Maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.6 Mixed occupancies. Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-2 occupancy portion of the building or to the exit stairway serving the Group R-2 occupancy.
Exception: Parking garages and occupied roofs that serve the Group R-2 occupancy shall be permitted to have direct access to the exit stairway.

Revise as follows:

1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, ~~or~~ 412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) and Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-2 occupancies complying with Section 1006.3.5.

~~2~~ 3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~ 4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~ 5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~ 6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.6.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. Maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.6 Mixed occupancies. Mixed occupancies shall be permitted in the building provided there are no exit access doors into the dwelling units or dwelling unit corridors directly from the other occupancies. Other occupancies shall not communicate with the Group R-2 occupancy portion of the building or with a single-exit stairway.**Exception:** Parking garages and occupied roofs that serve the Group R-2 occupancy shall be permitted to communicate with the exit stairway.

Revise as follows:

[BE] 1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, ~~or~~ 412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) and Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

Reason: Please refer to our attachment for an in-depth discussion of life safety and other issues.

The 2024 International Building Code allows buildings up to three stories of R-2 occupancy to have up to four dwelling units at each story served by a single exit. Our proposal acknowledges the rising demand for infill multifamily development and a growing movement across the United States to modify local building codes for this purpose. We recommend enabling a single exit to serve up to six stories of R-2 occupancy above the grade plane, or up to six units per floor in cases of at most three stories.

In return for the increased height or dwelling unit allowance, buildings would adhere to more stringent conditions than a traditional building. The building would be of Type IA, IB, IIA, or IV 1-hour fire resistant construction, dwelling units could not directly access the exit, active or passive smoke control systems would be required in the single exit, and there would be strict limits on travel distances and the

number of dwelling units per floor. The whole suite of ordinary fire safety measures contained in the IBC – access to the building by fire apparatus, fire sprinklers, etc. – would also still apply.

Our language is adapted from codes in Seattle, Honolulu, New York City, and Western European countries, collectively forming the most rigorous set of conditions for six-story buildings in the developed world. The limitations and requirements in our proposal match or exceed those in cities, suburbs, and rural areas around the developed world, where fire death rates are at or below the United States median. Within the U.S., Seattle, Honolulu, and New York City have allowed buildings with generally fewer restrictions, to no ill effect or local controversy, and no major fires that we are aware of.

Our proposal is intentionally cautious and may be subject to adjustment in future code cycles based on additional research and experience, expanding possibilities for such construction.

Bibliography: See attached.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

We believe the cost of constructing multifamily buildings on small lots will decrease by roughly 7 percent, in line with the reduction in circulation area required.

Estimated Immediate Cost Impact Justification (methodology and variables):

See attachment for details.

Attached Files

- **Single-stair proposal attachment.pdf**
  https://www.cdpaccess.com/proposal/10412/30836/files/download/4800/

E24-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The cost to build the single exit building with all the added requirements would negate the savings for the area with the single stairway. There seems to be a disregard for the fire service operations and basic code concepts. How would the emergency escape and rescue openings work in this taller building. This needs to be coordinated with Table 504.4 for types of construction and height limitations. Many jurisdictions are not dealing with infill lots, so this is not justified for new construction with larger lot sizes. Egress stairways are also used for other purposes other than egress from fire, such as police or emergency service responses. This might be better as an appendix for adoption by jurisdictions that have have a need. There should also be a height limit since stories can have different heights and mezzanines in the space - so a six story building could very widely in height. There should be more industry reports showing how the 2nd stairway is actually the limiting factor - what is provided seems to be antidotal. The loss of the 2nd stairway greatly increases the risk for the occupants. (Vote: 14-0)

E24-24

Individual Consideration Agenda

Comment 1:

IBC: 1006.3.4, 1006.3.5, 1006.3.5.1, 1006.3.5.2, 1006.3.5.3, 1006.3.5.4, 1006.3.5.5, 1006.3.5.6, 1006.3.5.7 (New), 1006.3.5.8 (New), 1006.3.5.8.1 (New), 1006.3.5.8.2 (New), 1006.3.5.8.3 (New), 1006.3.5.9 (New), 1023.12, 1031.2, 909.20; IFC: [BE] 1006.3.4, 1006.3.5, 1006.3.5.1, 1006.3.5.2, 1006.3.5.3, 1006.3.5.4, 1006.3.5.5 , 1006.3.5.6, 1006.3.5.7 (New), 1006.3.5.8 (New), 1006.3.5.8.1 (New), 1006.3.5.8.2 (New), 1006.3.5.8.3 (New), 1006.3.5.9 (New), [BE] 1023.12, [BE] 1031.2, [BF] 909.20

Proponents: Robert Marshall, San Mateo Consolidated Fire Department, Self (rmarshall@smcfire.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Group R-2 occupancies complying with Section 1006.3.5.
3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through ~~1006.3.5.6~~ 1006.3.5.9.

1006.3.5.1 Construction type. The building is Type IA, IB, or IIA~~, or IV~~ construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. The maximum ~~Maximum~~ exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than ~~25~~50 feet (~~7.62~~ 15.24 m).

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior ~~exit stairway or exterior~~ exit stairway enclosed in ~~Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a~~ a smokeproof enclosure in accordance with with Section 909.20.

Revise as follows:

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031. Ladder pads shall be provided for each rescue opening. Ladder pads shall consist of a sidewalk running beneath all emergency escape or rescue openings, or an individual pad 24 inches by 24 inches (609 mm by 609 mm) minimum and shall be made of a material that allows a fire department ground ladder to be securely anchored to the pad without slipping. Pads shall be placed a distance from the building that allows for the ground ladder to be placed at a safe ladder angle appropriate for the ladders used by the responding fire department.

1006.3.5.6 Mixed occupancies. ~~Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-2 occupancy portion of the building or to the exit stairway serving the Group R-2 occupancy.~~ The single means of egress stair for a Group R-2 occupancy shall not be shared with other occupancies located in mixed use occupancy buildings.

Exception: Parking garages and occupied roofs that only serve the Group R-2 occupancy shall be permitted to have direct access to the exit stairway.

Add new text as follows:

1006.3.5.7 Elevators. Buildings four or more stories above grade plane shall be equipped with an elevator. The elevator shall comply with Sections 3002.4 and also Sections 3008.2 through 3008.5.

1006.3.5.8 Fire protection systems. Fire protection systems shall comply with Sections 1006.3.5.8.1 through 1006.3.5.8.3.

1006.3.5.8.1 Standpipes. In buildings 3 or more stories in height an automatic wet, Class I standpipe shall be installed in accordance with Section 905. Standpipe outlets shall be configured in such a way as to minimize conflicts with egress from doors to individual units. Outlets shall not be placed on intermediate landings.

1006.3.5.8.2 Fire alarm system. In buildings 3 or more stories in height shall install an automatic fire alarm system in accordance with Section 907 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

1006.3.5.8.3 Automatic sprinkler system. An automatic sprinkler system, shall be installed in accordance with Section 903.3.1.1.

1006.3.5.9 Fire apparatus access. Where required by the fire code official, aerial fire apparatus access roads shall be provided in accordance with Appendix D, Section D105 of the International Fire Code.

1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2,412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) ~~and~~ or Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue*

opening shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

909.20 Smokeproof enclosures. Where required by ~~Section~~ Sections 1006.3.5.4 and 1023.12, a *smokeproof enclosure* shall be constructed in accordance with this section. A *smokeproof enclosure* shall consist of an *interior exit stairway* or *ramp* that is enclosed in accordance with the applicable provisions of Section 1023 and an open exterior balcony or pressurized *stair* and pressurized entrance vestibule meeting the requirements of this section. Where access to the roof is required by the *International Fire Code* , such access shall be from the *smokeproof enclosure* where a *smokeproof enclosure* is required.

2024 International Fire Code

[BE] 1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Group R-2 occupancies complying with Section 1006.3.5.
3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

Revise as follows:

1006.3.5 Group R-2 occupancies. In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.

2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.

Such building shall comply with Sections 1006.3.5.1 through ~~1006.3.5.6~~ 1006.3.5.9.

1006.3.5.1 Construction type. The building is Type IA, IB, or IIA~~, or IV~~ construction.

1006.3.5.2 Corridors. Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.3.5.3 Travel distance. The maximum ~~Maximum~~ exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than ~~25~~50 feet (~~7.62~~15.24 m).

Revise as follows:

1006.3.5.4 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior ~~exit stairway or exterior~~ exit stairway enclosed in ~~Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be~~ a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.5 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031. Ladder pads shall be provided for each rescue opening. Ladder pads shall consist of a sidewalk running beneath all emergency escape or rescue openings, or an individual pad 24 inches by 24 inches (609 mm by 609 mm) minimum and shall be made of a material that allows a fire department ground ladder to be securely anchored to the pad without slipping. Pads shall be placed a distance from the building that allows for the ground ladder to be placed at a safe ladder angle appropriate for the ladders used by the responding fire department.

1006.3.5.6 Mixed occupancies. ~~Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-2 occupancy portion of the building or to the exit stairway serving the Group R-2 occupancy.~~The single means of egress stair for a Group R-2 occupancy shall not be shared with other occupancies located in mixed use occupancy buildings.

Exception: Parking garages and occupied roofs that only serve the Group R-2 occupancy shall be permitted to communicate with the exit stairway.

Add new text as follows:

1006.3.5.7 Elevators. Buildings four or more stories above grade plane shall be equipped with an elevator. The elevator shall comply with Sections 3002.4 and also Sections 3008.2 through 3008.5.

1006.3.5.8 Fire protection systems. Fire protection systems shall comply with Sections 1006.3.5.8.1 through 1006.3.5.8.3.

1006.3.5.8.1 Standpipes. In buildings 3 or more stories in height an automatic wet, Class I standpipe shall be installed in accordance with section 905. Standpipe outlets shall be configured in such a way as to minimize conflicts with egress from doors to individual units. Outlets shall not be placed on intermediate landings.

1006.3.5.8.2 Fire alarm. In buildings 3 or more stories in height shall install an automatic fire alarm system in accordance with Section 907 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

1006.3.5.8.3 Automatic sprinkler system. An automatic sprinkler system, shall be installed in accordance with Section 903.3.1.1.

1006.3.5.9 Fire apparatus access. Where required by the fire code official, aerial fire apparatus access roads shall be provided in

accordance with Appendix D, Section D105.

[BE] 1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2,412.2.2.1 or 1006.3.5.4, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

Revise as follows:

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) ~~and~~ or Section 1006.3.5.5.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

[BF] 909.20 Smokeproof enclosures. Where required by ~~Section~~ Sections 1006.3.5.4 and1023.12, a *smokeproof enclosure* shall be constructed in accordance with this section. A smokeproof enclosure shall consist of an *interior exit stairway* or *ramp* that is enclosed in accordance with the applicable provisions of Section 1023 and an open exterior balcony meeting the requirements of this section. Where access to the roof is required, such access shall be from the smokeproof enclosure where a *smokeproof enclosure* is required.

Reason: The original proponent of E24-24 submitted a proposal for allowance of a single egress stair in an R-2 occupancy, and as part of that submittal, it was mentioned that code professionals needed to work with proponents to make this kind of thing possible. The committee voted it down 14-0. The original proposal was severely lacking in appropriate safety, and this proposal aims to add in measures to make such a proposal safer for both occupants and all responders, not just fire departments. The changes detailed in this proposal are as follows (In both the Building and Fire Codes, both are identical):

1. If a single stair is proposed for a project, then NFPA 13R sprinkler systems are not appropriate. The system should be a full sprinkler NFPA 13 system in accordance with 903.3.1.1, and this change was made in 1006.3.5.8.3. Cities that allow single stairs like Seattle and New York have a robust response ability. These departments have higher staffing levels, better water supplies, more fire apparatus, better training and better apparatus access than many places in the US. To counter this disparity in order to make this appropriate in all places in the country, the fire sprinkler system should be as robust as it can be.

2. A change was made to the construction types in the original proposal. The original proposal allowed for all type IV construction to have a single stair. Since most type IV construction allows for exposed wood, it isn't appropriate to allow that because of additional smoke generated.

3. The travel distance was increased to 50 feet from 25 in the original proposal. This was done for two reasons. First is the inclusion of elevators later in this proposal. Second is to allow for more room to stage hoselines.

4. The original proposal had an awkwardly worded section on the use of smokeproof enclosures, and addition of 2 hour fire barriers. The section was reworded to just require that the single egress stair comply with section 909.20 which includes all the fire barriers and stairway smoke protection of the original proposal.

5. A provision was added by the original proponent to require emergency egress and rescue windows into all buildings with a single stair. This proposal adds the requirement for ladder pads from which to anchor ladder rescue operations for the use of ground ladders. This is not something usually needed in buildings of Type I or Type II construction, so it is included here so it doesn't get overlooked. Guidance is given as to how the pads should be configured.

6. A provision was reworded from the original proposal allowing for only the occupants of the R-2 occupancy to use the sole egress stair in a mixed use building.

7. A provision was added to require elevators in buildings 4 stories or more in height. There is also a requirement that makes that elevator comply with gurney requirements, as well as a requirement to comply with some Chapter 30 sections for occupant egress elevators, specifically with regards to elimination of shunt trips and hoistway enclosure protection. This requirement was placed in the proposal so that fire and EMS crews did not need to risk their personal safety on an elevator during a medical call by carrying patients down 4 or more flights of stairs.

8. Better provisions for fire protection systems were added as well. The original proposal only added the passive fire protection and smoke control elements, and did nothing for Standpipes or fire alarm notification. This proposal adds a requirement for a class one standpipe, and a fire alarm system that adds voice evacuation.

9. The proposal also adds a pointer to fire access in accordance with Appendix D of the Fire Code for ladder truck access if required by the Fire Code Official.

10. Language was cleaned up from the original proposal that would have required all buildings to potentially comply with the two tables and 1006.3.5 when it should be an "Or" for emergency escape and recue openings in 1031.

All of these changes are designed to try and work with the proponents of the original proposal to allow what they'd like while still providing a greater level of safety for all responders as well as the occupants. The proponents of the original change took great pains to paint this as a housing affordability issue. While we agree that affordability is a concern, housing affordability should never include a disservice to those who can least afford a lesser degree of safety.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The addition of a fire alarm system, the elevators, and standpipes would increase the cost of construction over the increased cost impacts of the original proposal which also would have increased costs.
The rest of the requirements are generally editorial in nature over the cost impacts of the original proposal.

The cost would increase through maintenance of the required systems installed as a result of this proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

A Fire Alarm will increase the cost by a several thousand dollars if the system was not already required. (Depending on the size of the building a fire alarm may already be required, this would only add the differential of the voice evacuation piece.)

A Standpipe system would also increase the cost of construction by several thousand dollars if the building was not already required to have one.

Elevators would invrease the cost of the building by tens of thousands of dollars if the builder was not already planning on adding one. The provisions allowing for the reduction of fire sprinkler requirements and the elimination of the shunt trip would offset some of this cost by several thousand dollars.

Comment (CAH2)# 639

Comment 2:

IBC: APPENDIX Q (New), SECTION Q101 (New), Q101.1 (New), SECTION Q102 (New), Q102.1 (New), Q102.2 (New), Q102.3 (New), 1006.3.5, 1006.3.5.1, Q102.5 (New), Q102.5.1 (New), Q102.5.2 (New), Q102.5.3 (New), 1006.3.5.2, Q102.6.1 (New), 1006.3.5.3, 1006.3.5.4, 1006.3.5.6, Q102.10 (New), 1006.3.5.5, 1006.3.4, 1023.12, 1031.2

Proponents: Stephen Smith, Center for Building in North America (stephen@centerforbuilding.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Add new text as follows:

APPENDIX Q
SINGLE EXIT APARTMENT BUILDINGS

SECTION Q101
GENERAL

Q101.1 Scope. The scope of this appendix shall apply exclusively to Group R-2 apartment houses with access to a single exit. Such building shall be constructed in accordance with this appendix. **Exception:** Occupancies, other than Group H or I occupancies, are permitted only at the level of exit discharge and one story below the level of exit discharge.

SECTION Q102
APPLICATION

Q102.1 General. Stories within Group R-2 apartment houses served by a single exit shall comply with Sections Q102.2 through Q102.11.

Q102.2 Height. The height of the building shall comply with all of the following:

1. The building shall be six stories or less in height.
2. The building shall not be a high-rise building.

Exception: Occupiable roof areas shall be permitted where the area serves and is accessed through individual dwelling units.

Q102.3 Story size. The size of the stories shall comply with the following:

1. Each story shall have a maximum of four dwelling units.

2. The occupant load per story shall be 30 occupants maximum.

~~**1006.3.5 Group R-2 occupancies.** In Group R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:~~

~~1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units served per exit on each story.~~

~~2. The basement and first through third story above grade plane with a maximum of 6 dwelling units served per exit on each story.~~

~~Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.6.~~

~~**1006.3.5.1**~~ **Q102.4 Construction type.** The building is Type IA, IB, IIA, IIIA, ~~or~~ IV or VA construction.

Add new text as follows:

Q102.5 Fire protection systems. Fire protection systems shall comply with Q102.5.1 through Q102.5.3.

Q102.5.1 Automatic sprinkler system. The building shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Residential-type sprinklers shall be used in all habitable spaces in each dwelling unit.

Q102.5.2 Standpipes. Class I standpipe shall be provided in accordance with Section 905. Standpipe outlets shall be configured in such a way as to minimize the hose conflicting with egress from doors to individual dwelling units.

Q102.5.3 Fire Alarm System. A fire alarm system and smoke alarms shall be installed in accordance with Section 907.2.9.

~~**1006.3.5.2**~~ **Q102.6 Corridors.** Dwelling units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

Add new text as follows:

Q102.6.1 Elevators. Elevator hoistway doors shall be protected in accordance with Section 3006.3.

~~**1006.3.5.3**~~ **Q102.7 Travel distance.** Maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

~~**1006.3.5.4**~~ **Q102.8 Exit stairways.** Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

~~**1006.3.5.6**~~ **Q102.9 Mixed occupancies.** Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-2 occupancy portion of the building or to the exit stairway serving the Group R-2 occupancy.

~~**Exception:** Parking garages and occupied roofs that serve the Group R-2 occupancy shall be permitted to have direct access to the exit stairway.~~

Add new text as follows:

Q102.10 Egress courts. The single exit shall not terminate in an egress court where the court depth exceeds the court width unless

direct and unobstructed access to the public way through two or more independent paths is provided.

~~1006.3.5.5~~ Q102.11 **Emergency escape and rescue openings.** Emergency escape and rescue openings shall be provided in every sleeping room in accordance with ~~Section 1031~~ Sections 1031.2.1 through 1031.6.

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. ~~Group R-1 and R-2 occupancies complying with Section 1006.3.5.~~
3. ~~3.~~ 2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.
4. ~~4.~~ 3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.
5. ~~5.~~ 4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.
6. ~~6.~~ 5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:
   1. ~~6.1.~~ 5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.
   2. ~~6.2.~~ 5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, or 412.2.2.1 ~~or 1006.3.5.5~~, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2) ~~and Section 1006.3.5.5~~.
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way*.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.

5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: Updated E24-24 single-exit proposal

Based on feedback from egress committee members and other code and fire officials and professionals, we have chosen to rewrite our single-exit apartment building proposal, using Seattle's current code section as a base but placing the entire section in an optional appendix.

In this new reason statement, we present extensive research from the Netherlands on fires in different types of multifamily buildings, supported by modeling and field experiments over the years. We also present preliminary findings on New York City's experience with its own single-exit buildings, supported by a novel fire loss history data set. We also summarize events in jurisdictions throughout the country that speak to the need for guidance from a model code. Finally, we address some frequently asked questions.

Code updates

The most consequential change to our proposal is the location: we have moved it out of Chapter 10, and into a newly created Appendix Q, which jurisdictions are free to adopt or ignore as they see fit. This is in response to the many commenters who have said that they feel the issue is best left to state and local jurisdictions (see the "Need" section of this statement for our explanation for why we still believe there is an ICC role here).

Beyond that, we have aligned our proposal more closely with Seattle's existing single-stair building code section. We have added a number of new requirements (mostly guardrail-type requirements), and removed one as well (some limitations on construction type).

Substantively, we have matched Seattle's existing requirement for NFPA 13 sprinklers regardless of height. In practice, this will add an NFPA 13 sprinkler requirement in four-story buildings that are otherwise allowed by the International Building Code to have NFPA 13R systems. This makes our sprinkler requirement more stringent than that of New York City's code (which allows NFPA 13R systems up to six stories, including in single-stair buildings), and more stringent than that of the main body of the IBC (which allows NFPA 13R systems in residential occupancies up to and including four stories). We have added restrictions on roof decks, added language that gives AHJs greater flexibility to determine standpipe locations, and have added a reminder that fire and smoke alarms must still be installed.

We have responded to concerns that developers may try to find loopholes around the six-story limit and travel distance and unit limits by placing additional limits on height and floor area. For height, we do not allow single-exit buildings to be classified as high-rises, limiting the distance from the level of firefighter vehicle access to the uppermost floor or occupied roof to 75 ft. For floor area, we have added a hard limit of 30 occupants – or 6,000 sq. ft. – per floor. While we do not anticipate this being achievable in normal circumstances given the travel distance limitations, we want to preempt unforeseen loopholes and make it clear to committee and voting members that these would be very small buildings, with individual floors that are a small fraction of the size of ordinary multifamily buildings meeting the requirements of the main body of the International Building Code, often having dozens of units arrayed off of an non-compartmentalized corridor, sharing just two stairs.

In this updated proposal we defer to Seattle's current requirements for one-hour construction, and, based on feedback from the spring, expand the construction types allowed to all that require a fire resistance rating of at least one hour for the primary structural frame, interior and exterior bearing walls, and roof and floor construction. This applies a more consistent standard than our original proposal, and also improves constructibility by allowing the use of the more common and affordable III-A and V-A construction types, while still disallowing the less protected II-B, III-B, and V-B types.

Research

Dutch research

The Netherlands has one of the lowest rates of fire death in the developed world, with a per-capita fatality rate that is just one-fifth of that

of the United States.[1] It has also the strictest rules on single-stair buildings in Europe.[2] The Nederlands Instituut Publieke Veiligheid (NIPV, or the Dutch Institute for Public Safety), the Instituut Fysieke Veiligheid at the Brandweeracademie (Institute for Physical Safety at the Fire Academy), and Nieman Raadgevende Ingenieurs (Nieman Consulting Engineers) have released a series of reports about safety in common Dutch multifamily typologies. These findings – which include statistical analyses of fire safety outcomes, smoke spread modeling, and field experiments, among other methodologies – speak to the improved safety of small, single-exit apartment buildings compared to larger, double-loaded corridor designs.

All reports are cited in the original Dutch, with a link to a version fully machine-translated into English in the bibliography. These documents are long, and the depth and rigor of the research far exceeds that of anything produced to justify basic, prescriptive multifamily codes in the United States, either by government agencies, standards development organizations, or academia. We highly recommend that the committee members read them.
The typical single stair building in the Netherlands, known as a portiekwoning, is made of non-combustible construction, and has a balcony where one can await rescue assistance. Portiekwoningen do not have fire sprinklers or active smoke control systems. Apartments usually open directly onto stairwells, and historically no self-closers were required on apartment doors. Rules have changed over the years, but fire apparatus access has not generally been required on all sides.[3]

Researchers at Nieman found that, according to government statistics from 2001 through 2008, fire fatalities in portiekwoningen occurred at roughly the same rate as the average dwelling in the country.[4] More recent data from NIPV again suggests the rate of fire fatalities in portiekwoningen is not notably different from that of the average Dutch dwelling. In the latest report, updated estimates of the number of single-stair buildings were not produced. However, based on the Netherlands' extremely low rate of fire fatality, it is safe to conclude that these buildings performed far better than the average US home. This report also found that a slightly lower share of fatal fire victims died in circulation areas (like stairs and corridors) in single-stair portiekwoningen than in larger two-stair buildings with interior corridors.[5]

While single-exit portiekwoningen are much safer than the average U.S. dwelling, data showed elevated rates of rescue compared to other building types in the Netherlands. Unlike other European governments, the Dutch government was uncomfortable with the dependence on fire service rescue. Because they did not want to ban the construction of these single-exit buildings for reasons of housing affordability, they commissioned another report by Nieman to determine what rules could be added to bring these buildings up to a higher level of self-reliant safety (that is, allowing more people to self-evacuate). The report applied NIST's Consolidated Fire and Smoke Transport (CFAST) zone model to determine the effects of a fire breaking out in a ground floor apartment in a five-story, 10-unit apartment building where units open directly into the exit. It concluded that the most cost-effective risk reduction can be achieved by requiring self-closers on apartment doors (which had not been previously required), cutting risk by up to 76 percent.[6]

Dutch researchers have also looked into the safety of buildings that more closely resemble standard IBC-compliant double-loaded corridor multifamily buildings. Researchers at the Instituut Fysieke Veiligheid conducted 19 field experiments in a double-loaded corridor multifamily building, to examine smoke propagation within the building. The building contained a segment of a corridor 19 meters (62 feet) in length with five apartments on either side (for a total of 10 units), with a synthetic couch containing flexible polyurethane foam set on fire inside of one of the apartments (and of course, no fire sprinklers). The report concluded that smoke propagates horizontally more than vertically, and that "almost immediately" after opening the door from the room of origin to the common corridor, "the possibility of escape for people in other residences [opening onto the corridor] is seriously impaired, since the corridor will fill up with smoke in a matter of seconds."[7] Subsequent computer modeling also showed that in cases where a sprinkler is not provided or effective, the double-loaded corridor building does not deliver a level of safety for vulnerable occupants that is acceptable by Dutch standards.[8]

Because the I-Codes do not establish an absolute level of life safety that must be achieved, proposals must be judged relative to currently allowed conditions, and therefore the safety of double-loaded corridor buildings is relevant to our proposal. While our proposal strictly limits the size of floors and corridors, the main body of the IBC allows much longer corridors – up to 500 occupants can share a floor with just two stairs, with exit access travel distances of up to 250 feet per Table 1017.2 for R-2 occupancies. Common paths of travel can be up to 125 feet in length. Compared to the main body of the current IBC, our proposal significantly limits the number of occupants that could be exposed to the hazardous exit access conditions described by Dutch researchers if, in the event of a fire sprinkler system failure, an apartment door is held open and smoke compromises a common corridor, either because of hose operations or the failure of a self-closing door.

New York City findings

This section is adapted from a forthcoming but as-of-yet unpublished report by the Pew Research Center, on single-exit apartment buildings.

New York City has a large stock of modern, sprinklered single-exit buildings of four to six stories in height, and the Pew Research Center is in the process of compiling and analyzing the fire loss history in these buildings. This research is based first on two fire fatality data sets: one pulled from the National Fire Incident Reporting System, and another one compiled manually through a search of news accounts, with the U.S. Fire Administration's "Home Fire Fatalities in the News" dataset serving as the base, and a smaller number of other fires reported in the media added as they were found.[9] We then joined the fire fatality data to the city's PLUTO data set, which has enough physical and regulatory variables that we can identify, with a high degree of certainty, which apartment buildings have a single exit.

The research is still ongoing, but as of now, we have manually identified 462 civilian fatalities associated with fires in residential structures (single- and multifamily) in New York City dating back to 2012, with better coverage of more recent years. We have also analyzed NFIRS data from 2012 (before this year, the data is heavily corrupted) through 2022 (the most recent year that has been published), identifying 240 fire fatalities over the period that match with a still-extant building (a significant number of buildings that experienced a fatal fire are later demolished and therefore no longer match to a current building, but these tend to be older, smaller, light wood-frame dwellings). (Reporting to NFIRS by FDNY has always been incomplete, as it is in many jurisdictions, but since the pandemic FDNY reporting has dropped off dramatically, creating the need for the manual collection method to supplement the NFIRS data.)

New York City has long allowed single-exit multifamily buildings up to six stories in height with at most 2,000 sq. ft. per floor – first in its 1968 building code, with the allowance copied over without substantial modification into the 2008, 2014, and 2022 codes.[10] New York City has long had other items within the same code section that allow single-stair multifamily buildings under different criteria, but item 7 under Section 1006.3.2, allowing six stories and 2,000 sq. ft. per floor, is by far the most commonly used item for new construction, and is therefore the focus of our study. The city began requiring fire sprinklers in all new multifamily buildings in 1999.[11] New York City allows NFPA 13R sprinklers into all residential buildings up to six stories in height, including in all new single-stair multifamily buildings (which, when sprinklered, we will refer to as "modern single-stair buildings").[12]

We have identified over 4,000 modern single-stair buildings above the IBC's three-story height limit across the city built since the sprinkler requirement was put into place. Taking into account when each unit was built and the number of residential units within it, New York City has over 300,000 apartment-years of experience with these four- through six-story modern single-stair buildings. New York City has an average of 2.43 residents per unit, suggesting around 750,000 resident-years of experience with such buildings.[13]We have identified two fatal fires in modern single-stair buildings, claiming the lives of three civilians and no firefighters. We have not identified any fire deaths in single-stair buildings (that is, those built since 1968, but excluding tenement-style and other multifamily buildings before this time with one interior stair and one or more fire escapes) built before the sprinkler requirement was imposed, although for reasons of difficult zoning and weak demand, there are not many single-stair buildings from this period.

Over the 10-year period from 2014 through 2023, New York City has averaged 0.85 fatalities per year per 100,000 residents, or more than twice the rate as we have identified in modern single-stair buildings.[14] None of the three modern single-stair deaths appear to have occurred outside of the unit of origin, and from the information we have available, neither incident involved smoke or fire penetrating the single exit. The facts suggest that a second stair would not have saved any lives in either of these two buildings, and that New York City's experience with taller single-stair buildings has been good. For the sake of completeness and to convey to committee members the depth of our research, the details of the two fatal fires are summarized below.

Fatal fire at 351 East 54th St., Manhattan (March 3, 2021)

In 2021, a private developer completed construction of a six-story, 12-unit multifamily building at 351 East 54th St., in the Midtown East section of Manhattan. The building contains two studio apartments on every floor, one facing the front of the building and the other facing the rear (with no fire department access to these rear units, as is allowed by New York City's building code). Each floor is served by a single stair in an enclosed shaft, and an elevator opening onto the common corridor (with no hoistway opening protection aside from the landing doors). The building is fully sprinklered, likely in accordance with NFPA 13R standards (New York City modifies the IBC to allow NFPA 13R sprinkler systems for multifamily buildings up to and including six stories in height).

Shortly after completion, the developer sold the building to a non-profit landlord called the Metropolitan Council on Jewish Poverty (known as the "Met Council"). The Met Council's website describes the building as serving "moderate-income senior citizens with incomes less than 80% of the area median income," with applicants required to be at least 62 years old.[15]

Police told reporters at at least two outlets that a 73-year-old woman was killed in a fire in a first-floor apartment that broke out around 4:30 p.m. on March 3, 2021, and was under control by 5:15 p.m. There is no mention of any other deaths or injuries in the building, or spread of the fire or smoke to other floors of the building (one outlet reported flames only on the first floor).[16] The incident was not recorded in NFIRS, and FDNY has not yet responded to our request for a redacted fire marshal report.

Fatal fire at 71-02 162nd St., Queens (December 15, 2021)A developer completed a four-story, three-unit apartment building at 71-02 162nd St. in 2007, in the Flushing section of Queens. As permitted, the building was sprinklered and contained a recreation space in the cellar, a garage and single two-room apartment on the ground floor, a single four-room apartment on the second floor, and a single bilevel apartment spanning the third and fourth floors, with a private terrace on the fourth floor.[17] The neighborhood is one of the major centers of New York City's Chinese immigrant community, and has a very wide range of incomes, with residents including many very low-income residents, ranging from new arrivals to the country to retirees, and many illegally converted dwelling units of all types.

According to four news accounts, a fire broke out on the fourth floor of the building in the early morning of December 15, 2021, killing a 75-year-old woman and her 81-year-old husband and injuring one other adult. Firefighters told the New York Post that they found the building in "an advanced fire condition," with a "heavy clutter condition."[18]

The full fire marshal report paints a picture of a deeply troubled building. The ostensibly three-unit building had been divided into five different apartments, with one illegal unit carved out of the cellar, and the top floor unit subdivided into two apartments, with one per floor. Neither of the illegal units had a smoke detector, and the building had problems with heating. One surviving witness who lived in the fourth-floor unit stated that the heat had been recently malfunctioning, and that somebody (whose name is redacted, but who appears to be one of the victims) had a space heater plugged into an extension cord near their bed, and had been sleeping with a lit tea candle next to it. A 20-lb. tank of propane was found in the fourth-floor stairwell.[19]

The fire marshal report states that the fire consumed multiple rooms of the apartment – the bedroom of origin, the living room, the kitchen, and the other bedroom. A surviving occupant said somebody ran downstairs to get a fire extinguisher and then back up to the apartment on fire, but could not stay because of the smoke and flames. Despite the high-risk conditions, the attempted reentry of one of the residents, and the advanced state of the fire by the time firefighters arrived, the NFIRS record shows that the fire did not damage any floor except the top one, and images from the scene back that up by showing intact windows on the third floor.

Need

Urban areas in the United States have experienced a worsening housing shortage over the past few decades, as demand has returned to American cities after years of decay and abandonment, while housing production has remained low. Starting around a decade ago, advocates and policymakers have looked to reform land use regulations to remove impediments to housing construction in U.S. cities and suburbs. But with construction costs for denser forms of housing remaining very high, there is concern that zoning reform alone will not be enough to make housing in American cities affordable again.
North America may be unique in the world in having construction costs that rise substantially as buildings grow denser. RSMeans Data, the most comprehensive database of construction costs
in the United States, shows that per-square-foot construction costs steadily rise as housing typologies grow in density – from $148 per square foot for a two-story single-family house to $190 per square foot for a three-story garden apartment complex to $227 (open shop) to $257 per square foot (union) for a six-story, reinforced concrete apartment building.[20] A cost guide for Canada, which has similar building codes to the United States, shows the same upward-sloping cost-density gradient, with freestanding single-family houses costing $210 (in Canadian dollars) per square foot to build in the Greater Toronto Area, wood-framed condos up to six stories costing $245 per square foot, and high-rises costing $285 to $365 per square foot, depending on height.[21]

Outside of North America, on the other hand, construction costs remain roughly the same across building types, sometimes even falling as construction grows from single- to multifamily. The German BKI Kostenplaner 2024, for example, shows that a one- or two-family house built to a mid-market standard costs on average €1,945 per square meter ($197 per square foot), a low-rise apartment building with up six units costs €1,770 per square meter ($179 per square foot), and a larger mid-rise apartment building costs around €1,700 per square meter ($172 per square foot).[22] Construction cost guides from Italy and Mexico show similar flat or even downward-sloping cost-density gradients.[23]

In the 1990s and 2000s, the United States real estate market overwhelmingly delivered new housing in the form of single-family houses. Since the 2007-2008 financial crisis, however, development has shifted to something closer to an even split between single- and multifamily homes. As should be expected as apartment construction grows, policymakers are becoming concerned about the hard costs

– not just zoning-driven land costs – of multifamily housing, with construction costs in coastal California markets, for example, rising to an average of around $500 for even subsidized "affordable" multifamily development.[24] Given the large amount of space occupied by exits on small lots, where cities and states with housing crises are trying to encourage infill development through zoning reform, the IBC's second exit requirement starting at a height that is unusually low for the developed world has emerged as a major area of concern.[25]Even prior to our single-exit proposal, New York, Seattle, and Honolulu already felt that the IBC's three-story single-exit multifamily height limit was overly restrictive, and developed code sections allowing single-exit multifamily buildings up to six stories. Vermont and Georgia allow single-exit apartment buildings to rise to four stories through adoption of NFPA 101's egress provisions in lieu of IBC Chapter 10, and anecdotal evidence suggests that a significant number of four-story, single-exit buildings have been built in and around Atlanta.[26]

More recently, legislation has been advanced (and in many cases passed) in California, Colorado, Connecticut, Minnesota, Nashville, New York City, New York State, Oregon, Pennsylvania, Tennessee, Virginia, and Washington State to study, adopt, or enable local adoption of amendments to the IBC to allow taller single-exit buildings.[27] We are aware of multiple other efforts that are not yet public. In some states, the debate over taller single-stair buildings has opened up wider discussion about buildings codes. In California, Gov. Gavin Newsom issued an executive order in August 2024 directing state agencies to "identify and explore opportunities to update the state Building Standards Code to lower the cost of, while increasing flexibility for, infill development" – a move that one publication characterized as the governor "tak[ing] aim" at the state's IBC-based building code.[28]

In the absence of guidance from the ICC on how to safely allow taller single-exit apartment buildings, jurisdictions will continue to move forward with their own amendments. A lack of any movement in the 2027 IBC on single-exit apartment buildings will inevitably raise questions in the minds of policymakers about the I-Codes' ability to adapt to new information, new technologies, and new economic circumstances, as it already has in California. This is not likely to stop at amendments to Section 10 of the IBC.

Frequently asked questions

Q: With all of these requirements (especially for stairway pressurization), are these buildings even economically viable?

A: Our proposal is based on language that has been refined over two generations in Seattle. Many four-, five-, and six-story single-exit apartment buildings – ranging from affordable walk-up rentals to luxury condos with elevators – have been built over a number of real estate cycles under the current language. Developers can – and often do – avoid the expense of mechanical pressurization systems by using an exterior stairway, which uses natural ventilation to keep the exit free of life-threatening amounts of smoke at lower cost. In any case, our appendix adds an additional compliance path to the main body of the code without removing any existing options, so it cannot harm the viability of any project.

Q: Some jurisdictions either have required or are considering requiring wider stairways.29 Why is that not part of your proposal? (Alternatively: How will firefighters adapt to not having the use of a dedicated attack stair?)

A: Many in the fire service have stated that multifamily buildings need two stairways because in a fire, responding firefighters designate one stairway to be used for firefighter attack and the other for egress, and therefore, a single stair, if allowed, should be wider to accommodate bidirectional flows. These statements ignore the fact that current fire service training does not fully rely on perfectly segregated attack and egress stairs, and that any such strategy would likely be deadly in a fire given current code limitations.

Regarding existing practice, in our original Group A CAH #1 reason statement we shared published excerpts from books written by firefighters that state that it is often not possible in practice to designate separate exits for occupant egress and firefighter attack in two-stair buildings. These back up statements made in private interviews by fire service officials: firefighters do not bar occupants trying to escape smoke-filled floors from using the nearest exit because they are using it to attack a fire, and segregating egress and attack is in practice, in the words of one fire service official, "a mess."

Beyond claims of impracticality from the fire service itself, the logic of the existing code does not support the idea of well segregated flows. Not only is there no requirement that stairs be positioned close to each other to allow firefighters to easily segregate flows, but Section 1007.1.1 ("Two exits or exit access doorways") now effectively forbids the practice. Table 1017.2 ("Exit access travel distance") sets 250 feet as the maximum travel distance within the exit access portion of the means of egress for residential occupancies. In a

typical two-stair, double-loaded corridor building, this means that while the nearest stair can be at most 250 feet away, the second-nearest stair can be even more distant from any apartment door. If firefighters tried to prevent occupants from using the nearest exit, occupants would have to potentially traverse distances in excess of 750 feet to reach an exit – up to 250 feet to the nearest stair (since there is no public address system required to tell them which stair to use), plus another 250 feet to return to their unit, plus over 250 feet to reach the second-nearest exit, in a likely unfamiliar location. This is clearly not a tenable practice, and therefore we must assume that occupants will often evacuate using the nearest exit even in apartment buildings with multiple exits.Given the impracticality of perfectly segregating flows, we must evaluate the numbers of occupants that may be trying to egress through a stair that firefighters would like to use for attack operations. Table 1006.3.3 (“Minimum number of exits or access to exits per story or occupiable roofs”) currently allows up to 500 occupants per floor with only two stairs, or up to around 250 occupants nearest to each exit. Our proposal limits each floor to just 30 occupants in total, or 150 for the upper levels of the entire building.

Q: Why is there a requirement for emergency escape and rescue openings (EEROs) if there is no additional requirement for fire service access to openings?

A: The EERO requirement is to give firefighters the certainty that if they see a window in a sleeping room (that is, a bedroom or living room) and believe they can reach it with a ladder or aerial apparatus, it will be sized and located in such a way that a rescue will be possible.

1 Sokolov, Wagner, and Messerschmidt, “Center of Fire Statistics: World Fire Statistics"
2 Speckert, “Jurisdictions - The Second Egress: Building a Code Change.”
3 van der Graaf, Huijzer, and Eggink-Eilander, “Brandveiligheid portiekwoningen,” 16–25.

4 van der Graaf, Huijzer, and Eggink-Eilander, 29.
5 Kobes et al., “Wat als er brand uitbreekt? Een onderzoek naar fatale woningbranden en reddingen door de brandweer,” 37.

6 de Witte and van Herpen, “Onderzoek Rookbeheersing Portiekoplossingen.”
7 Ebus et al., “Rookverspreiding in woongebouwen: Hoofdrapport van de praktijkexperimenten in een woongebouw met inpandige gangen.”

8 van Liempd et al., “Rookverspreiding en persoonlijke veiligheid: Voorzieningen voor vluchtveiligheid en stay-in-place.”9“Home Fire Fatalities in the News.”
10 “1968 Building Code of the City of New York,” 27–366, item 1(b); “2008 New York City Building Code,” 1018.2, item 5; “2014 New York City Building Code,” 1021.2, item 5; “2022 New York City Building Code,” 1006.3.2, item 7.
11 Goodnough, “Bill Is Passed Requiring Sprinklers in Most New Residences.”

12 “2022 New York City Building Code,” Sec. 903.3.1.2.

13 Smith, “Sprinklered Single-Stair Building Unit Counts.”

14 “Fire Commissioner Nigro Announces 5% Decrease in Fire Deaths For 2020”; Balsamini, “Number of Fatalities from NYC Fires Jumped 16 Percent in 2021, Data Shows”; Kelly, “Lithium Batteries Drive Fire Death Toll to 106 Across City in ‘23, Highest in 20 Years.”
15 “Elderly Housing Through the Inclusionary Housing Program.”

16 Dole, “Woman, 73, Dies in Apartment Fire in Manhattan,” 73; Elizade, “73-Year-Old Woman Killed in NYC Apartment Building Fire.”

17 “New Building Application, Job No. 402186148.”

18 Sundstrom and Solomon, “2 Dead after Fire Rips through Queens Apartment: FDNY”; Woods and Marino, “Elderly Couple among Three Killed in Queens, Brooklyn Fires”; “2 Dead, 1 Injured After Fire At Queens Apartment Building”; Kriegstein, McShane, and Tracy, “Apartment Fires in Brooklyn, Queens Kills Elderly Couple, 27-Year-Old Man in Deadly 45-Minute Span.”

19 “Bureau of Fire Investigation Report, Job Number 41137 2021.”
20 Gordian, “RSMeans Data.”

21 Altus Group, “2024 Canadian Cost Guide.”
22 BKI Baukosten Gebäude Neubau 2024.

23 Prezzi Tipologie Edilizie 2024; González Meléndez, Costos Paramétricos.
24 California Tax Credit Allocation Committee, “9% Applications Requesting Federal and State Credits.”

25 Rodriguez, “One Small Step for Apartment-Kind.”
26Georgia State Amendments to the International Building Code (2018 Edition).”
27 Smith, “Single-Stair Tracker.”

28 Newsom, “Executive Order N-2-24”; “Newsom Takes Aim at California’s Building Codes.”

29 City of Austin Development Services Department, “Proposed IBC 2024 Code v1, Draft Subject to Additional Changes”; 2023 Revised Ordinances of Honolulu, § 16-1.1.

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Cost Impact: Decrease

Estimated Immediate Cost Impact:

We believe the cost of constructing multifamily buildings on small lots will decrease by roughly 7 percent, in line with the reduction in circulation area required.

Estimated Immediate Cost Impact Justification (methodology and variables):

See attachment to original proposal for details.

Comment (CAH2)# 395

E25-24

IBC: 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.5.3.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1006.3.5.7 (New), 1023.12, 1031.2; IFC: [BE] 1006.3.4, 1006.3.5 (New), 1006.3.5.1 (New), 1006.3.5.2 (New), 1006.3.5.3 (New), 1006.5.3.4 (New), 1006.3.5.5 (New), 1006.3.5.6 (New), 1006.3.5.7 (New), [BE] 1023.12, [BE] 1031.2

Proposed Change as Submitted

Proponents: Scott Brody, Self (sbrody96@gmail.com)

2024 International Building Code

Revise as follows:

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-1 and R-2 occupancies complying with Section 1006.3.5.

~~2~~ 3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~ 4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~ 5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~ 6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to exits at other *stories*, is permitted to serve individual *stories* , mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each *story* of a mixed occupancy *building*, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-1 and R-2 occupancies. In Group R-1 and R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units or sleeping units per story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units or sleeping units per story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Automatic sprinkler system. An automatic sprinkler system shall be installed throughout in accordance with Section 903.3.1.1.

1006.3.5.3 Corridors. Dwelling units or sleeping units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

1006.5.3.4 Travel distance. For Group R-1, the maximum exit access travel distance shall be not more than 75 feet (22.9 m). For Group R-2, the maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.5 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.6 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.7 Mixed occupancies. Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-1 and R-2 occupancy portion of the building or to the exit stairway serving the Group R-1 and R-2 occupancy. **Exception:** Parking garages and occupied roofs that serve the Group R-1 and R-2 occupancy shall be permitted to have direct access to the exit stairway.

Revise as follows:

1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, ~~or~~ 412.2.2.1 or 1006.3.5.5, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.
3. Group R-1 and R-2 occupancies located in stories with one one exit as permitted by Section 1006.3.5.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.

5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

2024 International Fire Code

Revise as follows:

[BE] 1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any story or *occupiable roof*, where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

2. Group R-1 and R-2 occupancies complying with Section 1006.3.5.

~~2~~ 3. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~3~~ 4. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~4~~ 5. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~5~~ 6. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

   ~~5.1~~ 6.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

   ~~5.2~~ 6.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

[BE] TABLE 1006.3.4(1) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c]	4 dwelling units	125 feet
Fourth story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).

c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

[BE] TABLE 1006.3.4(2) STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c]	10	75
	S[b, d]	29	75
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

[BE] 1006.3.4.1 Mixed occupancies. Where one *exit*, or *exit access stairway* or *ramp* providing access to *exits* at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single *exits* provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative *occupant loads* from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single *exit* shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where *dwelling units* are located on a story with other occupancies, the actual number of *dwelling units* divided by four plus the ratio from the other occupancy does not exceed one.

Add new text as follows:

1006.3.5 Group R-1 and R-2 occupancies. In Group R-1 and R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:

1. The basement and first through sixth story above grade plane with a maximum of 4 dwelling units or sleeping units per story.
2. The basement and first through third story above grade plane with a maximum of 6 dwelling units or sleeping units per story.

Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.

1006.3.5.1 Construction type. The building is Type IA, IB, IIA, or IV construction.

1006.3.5.2 Automatic sprinkler system. An automatic sprinkler system shall be installed throughout in accordance with Section 903.3.1.1.

1006.3.5.3 Corridors. Dwelling units or sleeping units that do not open directly into an exterior exit stairway shall exit directly to a corridor

complying with Section 1020.

1006.5.3.4 Travel distance. For Group R-1, the maximum exit access travel distance shall be not more than 75 feet (22.9 m). For Group R-2, the maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

1006.3.5.5 Exit stairways. Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

1006.3.5.6 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided in accordance with Section 1031.

1006.3.5.7 Mixed occupancies. Mixed occupancies shall be permitted at and below the level of exit discharge. Other occupancies shall not have direct access to the Group R-1 and R-2 occupancy portion of the building or to the exit stairway serving the Group R-1 and R-2 occupancy. **Exception:** Parking garages and occupied roofs that serve the Group R-1 and R-2 occupancy shall be permitted to have direct access to the exit stairway.

Revise as follows:

[BE] 1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, ~~or~~ 412.2.2.1 or 1006.3.5.5, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.
3. Group R-1 and R-2 occupancies located in stories with one one exit as permitted by Section 1006.3.5.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.

5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

Reason: Many years ago, fire officials drafted codes based on their intuition of what's safest. These codes saved lives, but not all rules remain consistent with evidence. Hundreds of thousands of fires occur annually, resulting in several thousand deaths a year. There is further a huge amount of evidence internationally. Therefore, even if past performance cannot predict every single possibility, there is enough data to say past performance closely reflects the level of risk. Old assumptions from before the Internet age, and before the advent of more modern fire-safety technologies, warrant fresh reexamination. I am accordingly proposing a new code section, because the existing requirements appear based on the following erroneous assumptions:

1) Bigger buildings with more staircases are safer than smaller buildings with fewer staircases.

2) Redundant staircases are so beneficial that it is safer to provide two nearby staircases without smoke control than a single staircase which resists smoke contamination via elements such as being open air, having a smoke-resistant vestibule with automatic opening windows, or being protected with a pressurization system.

3) Transient occupancies like hotels are more dangerous than ordinary dwellings, even when accounting for the additional protective features this construction type is typically required to follow.

All these assumptions are challenged by data. Therefore, it is imperative that the code be updated to provide fair treatment based on risk.

Previously, I assisted two other individuals to support a code change proposal in R-2 (non-transient) single exit cases. That proposal (10412) contains a reason statement, based on citations, that explains why small single exit buildings with enhanced protectives experience satisfactory safety performance. Please accept that proposal's reason statement here as well. Please additionally accept the following reasoning in support of extending allowances to hotels:

Per NFPA's latest Home Structure Fires Report, 49% of fires involve cooking. Cooking is much less likely to occur in hotel/motel occupancies because many rooms don't include kitchens. Even a room does include a kitchen or kitchenette, it may be less utilized if the hotel offers breakfast, people receive other meals at events like conferences or weddings, or they choose to use limited vacation time to go to restaurants vs shopping for ingredients and cooking themselves.

The second highest fatality generator is heating equipment, such as space heaters. These fires cause 13% of deaths. I don't have data on this, but reasonably believe people don't commonly travel to hotels with space heaters. If they come on an airplane, carrying heaters would waste baggage space and consume unnecessary weight allowance.

The final point on the NFPA list I will note is smoking materials. These are the 5th largest cause of fatal fires, generating 5% of deaths. Since many hotels are smoke-free, this is also less of a risk in this case.

In all, since potentially close to 2/3rds of the fire causes are eliminated, it is unjust for hotels to face stricter stairway requirements than similarly sized non-transient occupancies.

This risk argument is further supported by the 2010 US Fire Administration report on hotel fires. This shows hotels/motels experience less than half the number of fatalities per 1000 fires. Though injuries are slightly higher, since this is from 2005-2007 data, I wouldn't be surprised if the injury rate is now also lower in hotels, considering the proportion of new hotels fitted with sprinklers vs new single-family homes. On the subject of exit knowledge, since we are talking such small corridors, the hazard of people getting lost is extremely low. Further, research has linked central stair placement with huge increases in utilization of the stairs vs elevator. We can therefore expect more people to be familiar with the stair location in a small single stairway case vs the other scenario. If we are still concerned about wayfinding, this proposal could be amended to require low level egress path markers compliant with UL 1994, to reinforce the exit location.

Across the US and world, there are many small-scale hotels centered around an ornate central staircase. Some operate as bed and breakfasts. In the US, these buildings are often allowed due to their historic nature or are illegal conversions rented online. Given the demand for home-like transient buildings, the fire code should provide more options for this. Doing so will encourage more people to act under the purview of regulators, vs under-the-table operations.

As a final note, if the code committee is not comfortable going up to 6 stories single stair in this case, I believe they should at least raise the R1 single stair allowance to 3 or 4 stories. This would better reflect the level of risk in R1 vs R2 cases.

Bibliography: 1. Hall, S. Home Structure Fires Report. *National Fire Protection Association*. 2023. https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/home-structure-fires

2. Hotel and Motel Fires. Topical Fire Report Series. Volume 10, Issue 4 / January 2010. US Fire Administration. https://apps.usfa.fema.gov/downloads/pdf/statistics/v10i4.pdf

3. Bassett DR, Browning R, Conger SA, Wolff DL, Flynn JI. Architectural design and physical activity: an observational study of staircase and elevator use in different buildings. J Phys Act Health. 2013 May;10(4):556-62. https://doi.org/10.1123/jpah.10.4.556

SEE ADDITIONAL SOURCES IN Proposal 10412

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Since this allows for a new type of construction not currently allowed, there are no immediate cost impacts.

Compared with an existing allowed building, we expect a 7% new construction cost decrease. This is based on additional floor area not consumed by stairwells and inefficient corridors. The actual usable area would increase closer to 9%, but we assume some savings would be offset by investments in more advanced protectives such as smoke control systems. Thus, for a $2,000,000 small hotel, the costs would fall by $14,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Proposal 10412 attachment for additional cost details.

Estimated Life Cycle Cost Impact:

Estimated to be similar to the initial cost savings (7%), mainly due to lower HVAC costs, less maintenance of materials, and more leasable area.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See Proposal 10412 attachment for additional cost details.

Attached Files

- **Single-stair proposal attachment (2).pdf**
  https://www.cdpaccess.com/proposal/9653/28764/files/download/4799/

E25-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The disapproval is consistent with the committee action on E24-24. The transient nature of the occupants decreases the familiarity of the occupants with the building, so this single exit building should not be permitted for Group R-1 occupancies. (Vote: 14-0)

E25-24

Individual Consideration Agenda

Comment 1:

IBC: APPENDIX Q (New), SECTION Q101 (New), Q101.1 (New), SECTION Q102 (New), Q102.1 (New), Q102.2 (New), Q102.3 (New), 1006.3.5, 1006.3.5.1, Q102.5 (New), 1006.3.5.2, Q102.5.2 (New), Q102.5.3 (New), 1006.3.5.3, Q102.6.1 (New), 1006.5.3.4, 1006.3.5.5, 1006.3.5.7, Q102.10 (New), 1006.3.5.6, 1006.3.4, 1023.12, 1031.2

Proponents: Scott Brody, Self (sbrody96@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Add new text as follows:

APPENDIX Q
SINGLE EXIT RESIDENTIAL BUILDINGS

SECTION Q101
GENERAL

Q101.1 Scope. The scope of this appendix shall apply exclusively to Group R-1 and R-2 occupancies with access to a single exit. Such building shall be constructed in accordance with this appendix. **Exception:** Occupancies, other than Group H or I occupancies, are permitted only at the level of exit discharge and one story below the level of exit discharge.

SECTION Q102
APPLICATION

Q102.1 General. Stories within Group R-1 and R-2 occupancies served by a single exit shall comply with Sections Q102.2 through Q102.11.

Q102.2 Height. The height of the building shall comply with all of the following:

1. The building shall be six stories or less in height.
2. The building shall not be a high-rise building.

Exception: Occupiable roof areas shall be permitted where the area serves and is accessed through individual dwelling units or sleeping units.

Q102.3 Story size. The size of the stories shall comply with the following:

1. Each story shall have a maximum of four dwelling units or sleeping units.
2. The occupant load per story shall be 30 occupants maximum.

Revise as follows:

~~**1006.3.5 Group R-1 and R-2 occupancies.** In Group R-1 and R-2 occupancies, a single exit shall be permitted from any story or occupiable roof where the number of dwelling units served per exit at each story comply with one of the following:~~

1. ~~The basement and first through sixth story above grade plane with a maximum of 4 dwelling units or sleeping units per story.~~
2. ~~The basement and first through third story above grade plane with a maximum of 6 dwelling units or sleeping units per story.~~

~~Such building shall comply with Sections 1006.3.5.1 through 1006.3.5.7.~~

~~**1006.3.5.1**~~ **Q102.4 Construction type.** The building is Type IA, IB, IIA, IIIA, ~~or~~ IV or VA construction.

Add new text as follows:

Q102.5 Fire protection systems. Fire protection systems shall comply with Q102.5.1 through Q102.5.3.

~~**1006.3.5.2**~~ **Q102.5.1 Automatic sprinkler system.** The building shall be equipped throughout with an ~~An~~ automatic sprinkler system ~~shall be installed throughout~~ in accordance with Section 903.3.1.1.
Residential-type sprinklers shall be used in all habitable spaces in each dwelling unit or sleeping unit.

Add new text as follows:

Q102.5.2 Standpipes. Class I standpipe shall be provided in accordance with Section 905. Standpipe outlets shall be configured in such a way as to minimize the hose conflicting with egress from doors to individual dwelling units.

Q102.5.3 Fire Alarm System. A fire alarm system and smoke alarms shall be installed in accordance with Section 907.2.9.

~~**1006.3.5.3**~~ **Q102.6 Corridors.** Dwelling units or sleeping units that do not open directly into an exterior exit stairway shall exit directly to a corridor complying with Section 1020.

Add new text as follows:

Q102.6.1 Elevators. Elevator hoistway doors shall be protected in accordance with Section 3006.3.

~~**1006.5.3.4**~~ **Q102.7 Travel distance.** For Group R-1, the maximum exit access travel distance shall be not more than 75 feet (22.9 m). For Group R-2, the maximum exit access travel distance shall be not more than 125 feet (38.1 m). Travel distance from the exit access door of the unit to the exit door for the stairway shall be not more than 25 feet (7.62 m).

~~**1006.3.5.5**~~ **Q102.8 Exit stairways.** Means of egress shall be provided from each story above the level of exit discharge by an interior exit stairway or exterior exit stairway. Exit stairways shall be protected with 2-hour fire barriers in accordance with Section 707 or a 2-hour horizontal assemblies in accordance with Section 711. An interior exit stairway shall be a smokeproof enclosure in accordance with with Section 909.20.

~~**1006.3.5.7**~~ **Q102.9 Mixed occupancies.** Mixed occupancies shall be permitted at and below the level of exit discharge. Other

occupancies shall not have direct access to the Group R-1 and R-2 occupancy portion of the building or to the exit stairway serving the Group R-1 and R-2 occupancy.

~~**Exception:** Parking garages and occupied roofs that serve the Group R-1 and R-2 occupancy shall be permitted to have direct access to the exit stairway.~~

Add new text as follows:

Q102.10 Egress courts. The single exit shall not terminate in an egress court where the court depth exceeds the court width unless direct and unobstructed access to the public way through two or more independent paths is provided.

~~**1006.3.5.6**~~ **Q102.11 Emergency escape and rescue openings.** Emergency escape and rescue openings shall be provided in every sleeping room in accordance with ~~Section 1031~~ Sections 1031.2.1 through 1031.6.

1006.3.4 Single exits. A single *exit* or access to a single *exit* shall be permitted from any *story* or *occupiable roof* where one of the following conditions exists:

1. The *occupant load*, number of *dwelling units* and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).

~~2. Group R-1 and R-2 occupancies complying with Section 1006.3.5.~~

~~3.~~ 2. Rooms, areas and spaces complying with Section 1006.2.1 with *exits* that discharge directly to the exterior at the *level of exit discharge*, are permitted to have one *exit* or access to a single *exit*.

~~4.~~ 3. Parking garages where vehicles are mechanically parked shall be permitted to have one *exit* or access to a single *exit*.

~~5.~~ 4. Group R-3 and R-4 occupancies shall be permitted to have one *exit* or access to a single *exit*.

~~6.~~ 5. Individual single-story or multistory *dwelling units* shall be permitted to have a single *exit* or access to a single *exit* from the *dwelling unit* provided that both of the following criteria are met:

~~6.1.~~ 5.1. The *dwelling unit* complies with Section 1006.2.1 as a space with one *means of egress*.

~~6.2.~~ 5.2. Either the exit from the *dwelling unit* discharges directly to the exterior at the *level of exit discharge*, or the *exit access* outside the *dwelling unit's* entrance door provides access to not less than two *approved* independent *exits*.

1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2, or 412.2.2.1 ~~or 1006.3.5.5~~, interior exit *stairways* and *ramps* shall be *smokeproof enclosures* in accordance with Section 909.20.

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.
3. ~~Group R-1 and R-2 occupancies located in stories with one one exit as permitted by Section 1006.3.5.~~

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.

2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   5.1. One *means of egress* and one *emergency escape and rescue opening*.
   5.2. Two *means of egress*.

Reason: *CLAIM: The disapproval is consistent with the committee action on E24-24. The transient nature of the occupants decreases the familiarity of the occupants with the building, so this single exit building should not be permitted for Group R-1 occupancies.*

RESPONSE:
Committee's implied claim: Buildings allowed by the IBC to be larger and have no smoke control are safer than our proposed single stair building.
My apologies for not including this research previously… your claim is challenged by modeling from the Netherlands. The corridor building will not deliver safe sight lines, a key performance indicator of smoke and hot gas spread, if the fire is uncontrolled by a sprinkler. This was proven in burn tests with smoke measurement, and again by modeling, for both situations. As you can see in the below figure, concentration of smoke and harmful gasses in the corridor do not provide acceptable evacuation conditions in the typical case where the door to the unit sometimes opens for firefighting operations.

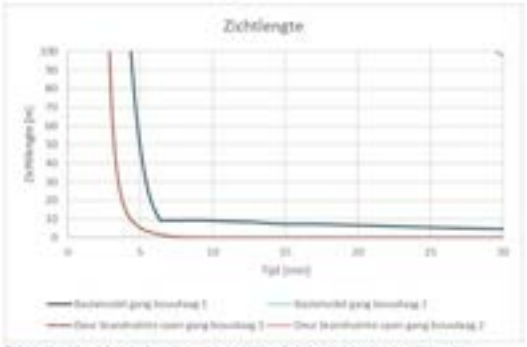


Figure 4.4 Line of sight length in the corridors for the residential building with corridor access at fire room door open/closed

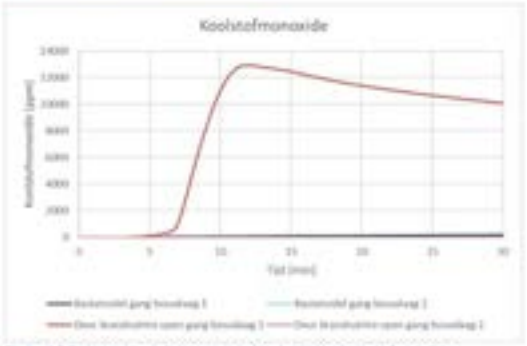


Figure 4.5 Concentration of carbon monoxide in the corridors in front of the residential building with corridor access with fire room door open/closed

Figure: Line of sight and carbon monoxide concentration graph for double loaded corridor building sofa fire. (Source: NIPV 2022, Smoke dispersion and

personal safety Facilities for escape safety and stay-in-place / Original in Dutch: Rookverspreiding en persoonlijke veiligheid:Voorzieningen voor vluchtveiligheid en stay-in-place. / see R2 proposal for translation) The fact that the corridor will not deliver safe conditions was also shown via burn tests in NIPVs Oudewater smoke propagation

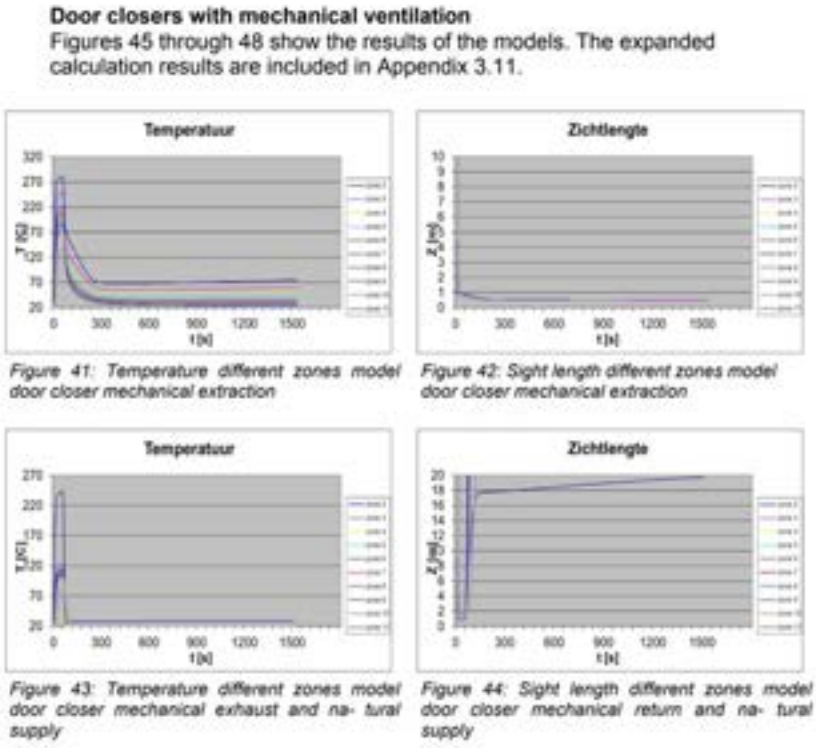


Figure: Key performance metrics for single exit building, determined in previous report by Nieman 2011. (See Research Smoke Control Porch Solutions / Witte, H.L. de, and R.A.P. van Herpen. Original in Dutch: Onderzoek Rookbeheersing Portiekoplossingen. Nieman Adviesburo B.V., September 2011/ see R2 proposal for translated copy) The fact that mechanical ventilation can deliver safe results was also proven in full scale burn testing conducted by the Colt Company in the UK.

On the other hand, the SIGHT LENGTH IS MUCH BETTER IN THE CASE OF THE SMALL SINGLE STAIR BUILDING with mechanical ventilation and self-closers. OTHER VARIABLES SIMILARLY SUGGEST THE VENTILATED SINGLE STAIR BUILDING WILL GENERALLY DELIVER SAFE CONDITIONS, WHILE THE CORRIDOR BUILDING WILL NOT. The finding that a mechanical smoke shaft can deliver safe conditions, but the unventilated corridor will not, is supported by both the above models, and full scale burn tests for each scenario. Other testing has shown natural ventilation can also work. Therefore, the current I-codes are inconsistent with research.

Our related R2 proposal provides more information on this claim. See there for full bibliography.

Occupant Familiarity – Committee Claim Challenged by Human Factors Studies

If occupant unfamiliarity is your reason for limiting single stair hotels even below 2 stories, it is illogical for code to mandate a layout that is proven to cause less occupant familiarity with the emergency exits.

According to the study Spatial Measures Associated with Stair Use, published in the American Journal of Health Prevention, “spatial qualities that optimize the convenience and legibility of stairs may have the most influence on stair use in buildings.”[1] Similarly, another study found shifting stair location from the ends to the center is associated with an increase in stair vs elevator use 8-10X%.[2] While our staircase being behind fire protectives would likely not lead to as high a utilization jump as the latter, basic human behavior tendencies still strongly imply moving the stair to the middle of the building would increase overall utilization. Therefore, the occupant familiarity argument is dubious.

Overall Hazard of R1 vs R2 – Committee Claim Discredited by Fire Data

The code committee is obligated to give due process to substantive comments. I will repeat what was stated previously. R1 OCCUPANCIES ARE MUCH LOWER FIRE RISK THAN R2. THEREFORE, YOUR CHOICE TO PLACE MUCH MORE ONEROUS RULES ON R1 IS AN ARBITRARY AND CAPRICIOUS AND COULD MAKE THE I-CODES SUCEPTIBLE TO COURT CHALLANGES.

Per NFPA's latest Home Structure Fires Report[3], 49% of fires involve cooking. Cooking is much less likely to occur in hotel/motel occupancies because many rooms don't include kitchens. Even if a room does include a kitchen or kitchenette, it may be less utilized if the hotel offers breakfast, people receive other meals at events like conferences or weddings, or they choose to use limited vacation time to go to restaurants vs cooking and cleaning dishes.

The second highest fatality generator is heating equipment, such as space heaters. These fires cause 13% of deaths. I don't have data on this but know people don't commonly travel to hotels with space heaters.

The final point of note on the NFPA list is smoking materials. These are the 5th largest cause of fatal fires, generating 5% of deaths. Since many hotels are smoke-free, this is also less of a risk in this case.

In all, since potentially CLOSE TO 2/3RDS OF THE FIRE CAUSES ARE ELIMINATED, it is ARBITRARY AND CAPRICIOUS for hotels to face stricter stairway requirements than similarly sized non-transient occupancies.

This risk argument is further supported by the 2010 US Fire Administration report on hotel fires. This shows HOTELS/MOTELS EXPERIENCE A MUCH LOWER NUMBER OF FATALITIES PER 1000 FIRES. Further, they had a low overall number of deaths. Though property damage was somewhat elevated, this is likely impacted by automatic extinguishing systems causing water damage.

Table 2. Loss measures for hotel and motel fires (three-year average, 2014-2016)

Measure	Hotel and motel fires	Confined hotel and motel fires	Nonconfined hotel and motel fires	Residential building fires (excluding hotel and motel fires)
Average loss:				
Fatalities/1,000 fires	3.2	0.0	7.1	5.8
Injuries/1,000 fires	24.0	4.6	48.2	25.6
Dollar loss/fire	$25,090	$250	$56,070	$17,420

Figure 1: Hotel vs Residential Building Fire deaths highlighted from USFA Report. [4]

The I-codes targeting of hotels and motels for more onerous exit rules is therefore unsubstantiated by evidence. Rather than trust assumptions by groups of people ages ago, folks who lacked computers, the I-codes should be listening to data and treating occupancies fairly based on their actual performance, which roughly equals risk when you have thousands of data points.

I-codes failure to provide 2 means of egress from hotel rooms places occupants in more danger than lack of two stairways

Because of how the IBC rules impact architecture, units tend to be abnormally long vs square. This commonly results in the layout where the kitchen is along the route of egress. In a hotel, if someone is heating food while working at the computer, their only egress from the room will be blocked by the fire. On the other hand, in my proposal, it would be easier to survive a fire in the room of fire origin because there is a second egress.

Figure 2: Small single stair building with egress balconies (Image own work)

Figure 3: Typical N American hotel with non-openable windows. (Image credit: Michael Rivera reuse permitted per CC BY SA 4.0, image adapted to remove hotel branding.)

Figure 4: Example of a hotel room where occupant trapped by fire. No way to escape, unlike the illegal single staircase building with secondary egress balcony (in Figure 2).

The committee appears to justify its approach in the idea that the stairway is the most hazardous location for occupants, but data on the size of fire spread shows 93.1% of hotel fires do not extend to multiple floors.[5] Therefore, the focus on having multiple staircases vs multiple ways out of the room is misguided.

Increasing Hazard by Pushing People to Unregulated Structures

By banning even 2-story single staircase transient occupancies, the committee ignores the elephant in the room – services like Air B&B. The very onerous IBC rules simply drive much of the population to rent dwellings unofficially, rather than through regulated channels. People also turn to historic bed and breakfasts for the old style, rather than stay in new single stair buildings that maintain the classic smaller proportions, but with better fire safety measures. It is similar to the problem of marijuana dispensary fires. For many years, fire

officials acted like marijuana is a fire hazard. Yet, in states where the substance was later legalized, it turned out cannabis growing did not really result in much hazard. Rather, it was overregulation which pushed activities under the table that actually contributed to dangerous situations. The I-code committee now has a chance avoid repeating this mistake with hotels.

Code must be changed because it is preempted by the Code of Federal Regulations (Federal Administrative Law), and ICC bylaw CP49-21 prohibits conflicts with US Federal Law

The Secretary of the Interior has issued regulations for preservation, rehabilitation, restoration or reconstruction of historic properties under the authority of Section 106 of the National Historic Preservation Act[6]. 36 CFR § 800.6 (b)(1)(i) requires government officials "seek ways to avoid, minimize or mitigate … adverse effects" on historic properties.[7]

IBC Inconsistent with Interior Secretary's Standards for Preserving "Size", "Scale", "Proportion" and other "Spatial Relationships" in Historic Districts

Per 36 CFR § 800.5 , adverse historic effects are defined to include work "that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;"
Per the Secretary's standards at 36 CFR § 68.3 (b)(9):[9]
New additions, exterior alterations or related **new construction will not destroy historic** materials, features and **spatial relationships** that characterize the property… The **new work will be … compatible with the historic** materials, features, **size, scale and proportion,** and massing to protect the integrity of the property and its environment.

In cases of restoration, it is stated that:
A property will be used as it was historically or be given a new use that interprets the property and its restoration period…. **alteration of features, spaces and spatial relationships that characterize the period will not be undertaken.**

Within 36 CFR § 68.3, similar requirements can be found for reconstruction and rehabilitation projects.

As defined in the National Historic Preservation Act, [54 U.S.C. § 300308]:

the term ''**historic property" means any** prehistoric or **historic district**, site, building, structure, or object included on, or eligible for inclusion on, the National Register [10]

While the I-codes allow reconstructions of historic buildings, the latest historic preservation regulations also require new buildings in historic districts to match the features and proportions of the district's historic period. Since the double exit rule effectively blocks construction of small buildings of varying heights, the historic proportions are impermissibly degraded. This breach of federal regulations is further unnecessary because higher levels of safety have been shown to be achievable in single stair buildings using methods similar to what we are proposing.

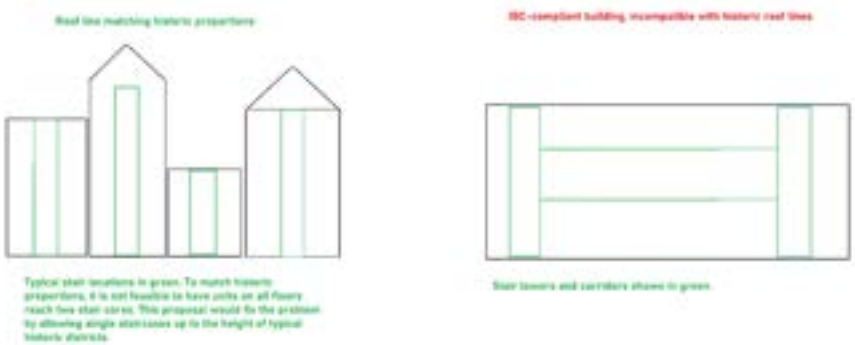


Figure: Shows how historic roofline typology is not able to be maintained with IBC rules.

Should your committee fail to take meaningful action, there is the possibility of preemption challenges being launched.

Old San Juan National Historic District. Photo own work.

Failure to include proven single stair safety previsions in the I-codes is also a tragedy for fire safety. Historic buildings often will never be renovated to have two stairs; therefore, the I-codes should provide better guidance on how to achieve safety alternatively for the many structures that are this way.

Thank you for your consideration.

1) G. Nicoll, "Spatial Measures Associated with Stair Use," American Journal of Health Promotion, 2007. [Online]. Available: https://journals.sagepub.com/doi/10.4278/0890-1171-21.4s.346?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200pubmed.
2) Basset et. al., "Architectural Design and Physical Activity: An Observational Study of Staircase and Elevator Use in Different Buildings," Journal of Physical Activity and Health, 2023. [Online]. Available: https://doi.org/10.1123/jpah.10.4.556.
3) Home Structure Fires Report. National Fire Protection Association. Hall. 2023. https://www.nfpa.org/education-and-research/research/nfpa-research/fire-statistical-reports/fire-loss-in-the-united-states
4) Hotel and Motel Fires (2014-2016). Topical Fire Series. US Fire Administration. 2016. https://www.usfa.fema.gov/downloads/pdf/statistics/v19i4.pdf
5) See Figure 3 in Citation 4.
6) An Introduction to Section 106. Advisory Council on Historic Preservation. Accessed July 2024. https://www.achp.gov/protecting-historic-properties/section-106-process/introduction-section-106
7) 36 CFR 800. Subpart B. The Section 106 Process. https://www.ecfr.gov/current/title-36/chapter-VIII/part-800/subpart-B
8) 36 CFR 800. Subpart B. The Section 106 Process. https://www.ecfr.gov/current/title-36/chapter-VIII/part-800/subpart-B
9) 36 CFR 68.3. The Secretary of the Interior's Standards for the Treatment of Historic Properties. Accessed 7/27/2024. Title 36 Last Amended 7/25/2024. Via Federal Register. https://www.ecfr.gov/current/title-36/chapter-I/part-68/section-68.3

Bibliography: See attachment.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Will allow more buildings to be built on constrained lots, therefore inherent land development value which didn't exist before. See original proposal for additional details.

Estimated Immediate Cost Impact Justification (methodology and variables):

Varies based on jurisdiction. See original proposal for additional details. See original proposal for additional details.

Estimated Life Cycle Cost Impact:

Building will not be especially costly to maintain if provided with natural vent systems. Probably in the range of several thousand dollars.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Please find a costs table at the following link:

https://docs.google.com/spreadsheets/d/13_euR2DQrf4xHUw4SaLjyiP119KTZXnyZRMoRfMO2Oo/edit?usp=sharing

This is based on the analysis Nieman Consulting Engineers prepared for the Netherlands government in 2011. Report translation is attached. Original is available at the following address:

https://open.overheid.nl/documenten/ronl-archief-d66b9d0a-bd74-44ed-9796-c4c43211bc68/pdf

I have attached a translation.
https://www.cdpaccess.com/p/comment/799/32933/files/download/8202/Nieman%202011%20Report%20Research%20Smoke%20Cont

Attached Files

- **Nieman 2011 Report Research Smoke Control Porch Solutions.pdf**
  https://www.cdpaccess.com/comment/799/32933/files/download/8202/

Comment (CAH2)# 799

E28-24

IBC: 1008.2.1, 1011.3, 1011.6, 1011.7.1, 1011.13, 1023.9, 1027.5, 2406.4.6; IFC: [BE] 1008.2.1, [BE] 1011.3, [BE] 1011.6, [BE] 1011.7.1, [BE] 1011.13, [BE] 1023.9, [BE] 1027.5

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, and exit stairways ~~and at their required landings~~, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. **Exception:** For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1011.3 Headroom. *Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* ~~and landing~~ . **Exceptions:**

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4\frac{3}{4}$ inches (121 mm).

1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each ~~*stairway*~~ *flight*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.7.1 Stairway walking surface. The walking surfaces ~~surface of treads and landings~~ of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

1011.13 Guards. *Guards* shall be provided along *stairways* ~~and landings~~ where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by *guards* installed in accordance with Section 1015.

1023.9 Stairway identification signs. A sign shall be provided at each floor level landing in an *interior exit stairway* and *ramp* connecting more than three *stories* designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stairway* or *ramp.* The signage shall state the story of and direction to the *exit discharge,* and the availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor level landing in a position that is readily visible when the doors are in the open and closed positions.

1027.5 Location. *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramp* ~~*ramps*~~, including the ramp landing ~~landings~~, to:

1. Adjacent *lot lines*.
2. Other portions of the *building*.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate *buildings*.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

2406.4.6 Glazing adjacent to stairways and ramps. Glazing where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the plane of the adjacent walking surface of *stairways*, ~~landings between *flights* of *stairs* and~~ *ramps* and ramp landings shall be considered to be a hazardous location. **Exceptions:**

1. The side of a *stairway*, ~~landing~~ ramp or *ramp* landing that has a *guard* complying with the provisions of Sections 1015 and 1607.9, and the plane of the glass is greater than 18 inches (457 mm) from the railing.
2. Glazing 36 inches (914 mm) or more measured horizontally from the walking surface.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, and exit stairways ~~and at their required landings~~, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1011.3 Headroom. *Stairways* shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* ~~and landing~~.

Exceptions:

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4^{3}/_{4}$ inches (121 mm).

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each ~~*stairway*~~ *flight*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing*and the intersection of the walkline of the upper *flight* at the *nosing*of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.7.1 Stairway walking surface. The walking surfaces ~~surface of treads and landings~~ of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

[BE] 1011.13 Guards. *Guards* shall be provided along *stairways* ~~and landings~~ where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by *guards* installed in accordance with Section 1015.

[BE] 1023.9 Stairway identification signs. A sign shall be provided at each floor level landing in an *interior exit stairway* and *ramp* connecting more than three stories designating the floor level, the terminus of the top and bottom of the *interior exit stairway* and *ramp* and the identification of the *stairway* or *ramp*. The signage shall state the story of, and the direction to, the *exit discharge* and the

availability of roof access from the *interior exit stairway* and *ramp* for the fire department. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor level landing in a position that is readily visible when the doors are in the open and closed positions.

[BE] 1027.5 Location. *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or *ramps*, including landings, to:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a *fire separation distance* of not less than 5 feet (1524 mm).

Reason: Stairway is a defined term and as such stairways have two basic components landings and flights. Flight is also a defined term and as such do not include landings. The same definitions appear in both the IBC and IRC is:

Stairway. One or more flights of stairs, either exterior or interior, **with the necessary landings** and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

Flight. A continuous run of rectangular treads, winders or combination thereof from one landing to another.

Landings are currently only required at the top and bottom of stairways. Landings and flights of stairs are the elements of a stairway. The current text is incorrect because landings are used between flights within a stairway to change direction or stride or to offer a rest not just at the top and bottom of a stairway. To correct this, we have deleted “stairway” and substituted “flight” in **1011.6 Stairway landings** and searched the code for further necessary changes related to the term landing.

In **1011.3 Headroom** and **1011.3 Guards**, we have deleted "and landings" because a stairway includes the landings by definition.

In **1011.7.1 Stairway walking surface**, we have deleted "treads and landings" as these terms are superfluous and understood as the defined components of the stairway.

In **1023.9 Stairway identification signs**, we have inserted "level" in two locations to more specifically describe that the landings where the required signs are to be located are at the floor levels.

In **1027.5 Location** we corrected the plurality of stairway and inserted "ramp" before landing because landings are part of a stairway but are not part of a ramp. We made similar changes in **2406.4.6 Glazing adjacent to stairways and ramps** and in **1008.2.1 Illumination level under normal power,** and also deleted "landings between flights of stairs and", "and at their required landings" respectively. The text was deleted because landings are defined as part of a stairway and the language is redundant.These corrections assure that landings are required at between flights of stairs as well as at the the top and bottom of stairways and provide for the correct use of the term stairway as defined in the code. Comprehensive changes have been made in each of the related IBC requirements relating to landings for both stairways and ramps to assure consistency throughout the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes in the text provide for clarification and consistent use of terms defined in the code and have no effect upon the cost of construction.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: While this proposal eliminates redundant language and focuses on defined terms, Section 1008.2.1 will be misread without 'landings'. (Vote: 10-4)

E28-24

Individual Consideration Agenda

Comment 1:

IBC: 1008.2.1, 1011.6, 1027.5; IFC: [BE] 1008.2.1, [BE] 1011.6, [BE] 1027.5

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, ~~and~~ exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. **Exception:** For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.

3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1027.5 Location. *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or ~~ramp~~ *ramps*, including ~~the ramp landing~~ landings, to:

1. Adjacent *lot lines*.
2. Other portions of the *building*.
3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate *buildings*.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a minimum *fire separation distance* of 5 feet (1525 mm).

2024 International Fire Code

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, ~~and~~ exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1027.5 Location. *Exterior exit stairways* and *ramps* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *stairway* or ~~ramp~~ *ramps*, including ~~the ramp landing~~ landings, to:

1. Adjacent lot lines.
2. Other portions of the building.

3. Other buildings on the same lot unless the adjacent building *exterior walls* and openings are protected in accordance with Section 705 of the International Building Code based on *fire separation distance*.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: *Exterior exit stairways* and *ramps* serving individual *dwelling units* of Group R-3 shall have a *fire separation distance* of not less than 5 feet (1524 mm).

Reason: In accordance with the committee's reason for disapproval and testimony related to 1027.5, the changes made in the original proposal to Sections 1008.2.1 and 1027.5 have been removed leaving them unchanged. However the intent of the original proposal is maintained, eliminating redundant text and promoting consistent interpretation through the correct use of terms as they are defined in the code. In 1011.6 Stairway landings we have "of stairs" following flight to match the language approved in E69 "...flight of stairs." Approval as modified by this comment addresses the committees reason for disapproval and proponents intent to clarify the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes in the text provide for clarification and consistent use of terms defined in the code and have no effect upon the cost of construction.

Comment (CAH2)# 110

E31-24

IBC: 1008.2.1; IFC: [BE] 1008.2.1

Proposed Change as Submitted

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

Revise as follows:

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. Illumination levels on *stairways* shall be measured at the *nosing* of each landing and tread at a horizontal distance 12 inches (305 mm) to 14 inches (356 mm) from the stair side of each *handrail.*

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. Illumination levels on *stairways* shall be measured at the *nosing* of each landing and tread at a horizontal distance 12 inches (305 mm) to 14 inches (356 mm) from the stair side of each *handrail.*

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: 1. To enhance safety by improving the visibility of stairs. Visibility is improved when there is visual contrast between the nosing and the portion of the tread near the riser. With overhead lighting, this contrast is created by (a) contrasting materials, and (b) the shadow created by the riser. If the 10fc minimum is interpreted to be measured in the shadow adjacent to the riser, then lighting will be designed to minimize this shadow and reduce contrast and hence reduce visibility.

2. To provide for greater consistency in application and enforcement of the code by specifying where readings are to be taken. There is a fair amount of disagreement about how far into the darkest corner a light meter should be placed when searching for the point with minimum illuminance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal could be interpreted to reduce overall light level requirements in stairs, which would reduce costs. This impact is likely minimal. There is no plausible scenario where this would increase costs.

E31-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This gives a measurement point to determine averages for officials and designers. The proposal puts the lighting levels on the walkline within reach of the handrail - this is where the lighting is most needed. (AS 11-3)

E31-24

Individual Consideration Agenda

Comment 1:

IBC: 1008.2.1; IFC: [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. Illumination levels on *stairways* shall be measured at the *nosing* of each landing, at the lowest *nosing* in each *flight*, and at one *nosing* in the middle of each *flight*, ~~and tread~~ at a horizontal distance 12 inches (305 mm) to 14 inches (356 mm) from the stair side of each *handrail*.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. Illumination levels on *stairways* shall be measured at the *nosing* of each landing, at the lowest *nosing* in each *flight*, and at one *nosing* in the middle of each *flight*, ~~and tread~~ at a horizontal distance 12 inches (305 mm) to 14 inches (356 mm) from the stair side of each *handrail*.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: The proponents of E31 got feedback from several interested parties who were concerned that requiring measurements at every nosing would make inspection difficult.

From a practical standpoint, we believe that measuring at three nosings on each flight (top, middle, and bottom) will achieve substantially the same result as measuring at every nosing.

From a safety standpoint, we are most concerned about lighting the transitions from flight to landing, so we have required measurement points there. And with a light at each landing (most often the case), the darkest point will be in the middle of the flight, so we have required a measurement point there.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By reducing the number of measurement points this proposal may make inspection and enforcement easier.

Comment (CAH2)# 348

E32-24

IBC: SECTION 202 (New), 1008.2.1; IFC: SECTION 202 (New), [BE] 1008.2.1

Proposed Change as Submitted

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, President, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

Add new definition as follows:

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Revise as follows:

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. ~~**Exception**~~ **Exceptions:**

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* adjacent to that *landing*.
   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on both *landings* adjacent to that *flight*.
   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.
   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.
   1.6. In *interior exit stairways*, *interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.
2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

Add new definition as follows:

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. **~~Exception~~ Exceptions:**

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* adjacent to that *landing*.
   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on both *landings* adjacent to that *flight*.
   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.
   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.
   1.6. In *interior exit stairways*, *interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: To provide necessary clarity for the safe installation of occupant sensors to conserve energy in unoccupied means of egress.

A lot of energy is wasted operating lights in unoccupied spaces. The IBC currently requires that light levels be maintained at 1 footcandle minimum in many types of unoccupied spaces, provided that those spaces serve other spaces which may be occupied. First, please consider that a 1 footcandle minimum implies an average of 2-5 footcandes with typical uniformity ratios. Second, please consider that there is often no practical way to determine if the "spaces served" are occupied (e.g. a corridor in a residential building serving multiple dwelling units is always assumed to be serving occupied spaces), so the 2-5 footcandle average illumination is maintained 24 hours/day, 365 days/year even with occupant sensors controlling the lights.

This proposal would allow a reduction of light levels to 1 footcandle average in unoccupied means of egress serving occupied spaces. The specified illuminance levels for the unoccupied condition (Exception 1.1) are identical to the illuminance level required while occupied under emergency power (1008.3.2). So these spaces are always maintained at a light level which has been deemed to be safe under all versions of the IBC dating back to 2000, even if the occupant sensors were to fail to raise light levels when an occupant entered.

Energy savings would be quite significant where occupant sensor controls are provided in spaces like corridors, warehouses, and open office areas, where anywhere from 50% to 80% less energy would be required to light unoccupied spaces.

To ensure that safety is not compromised, and to ensure consistent application and enforcement of the code, this proposal adds six requirements for the safe installation and operation of occupant sensors.

1.1 Specifies the illumination level for unoccupied means of egress (as explained above).

1.2 and 1.3 Allow for the most common lighting control strategy in stairways (occupant sensors integrated into fixtures) to be employed, provided that the sensors can detect motion for the full flight leading to each landing. This way occupants are never walking into darkness.

1.4 Requires that sensors automatically raise light levels when an occupant enters (i.e. manual-on "vacancy sensors" are not permitted).

1.5 Requires that occupant sensors keep lights at the occupied level 15 minutes after the last occupant leaves the control zone, to avoid "false offs" (i.e. where illumination levels are reduced while the space is still occupied).

1.6 Requires that critical spaces in the exit automatically rise their occupied level when the fire alarm system is triggered, because occupant sensors are not tested in smoke.

None of these safety requirements are included in the IECC.

Please note that ICC A117.1 includes language permitting the use of occupant sensors which are "equipped for fail-safe operation and evaluated for this purpose" along stairways. But controls manufacturers do not do this, and similar language was removed from NFPA101 in 2015.

Bibliography: ANSI/ICC 117.1 *Accessible and Usable Buildings and Facilities* 2017 – 4th Version: Sept 2022 International Code Council. Washington, DC

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not requireusers of the code to do anything. It allowsthem to install occupant sensing lighting controls to save energy.

E32-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There needs to be greater than just emergency lighting levels when an occupant sensor fails - there needs to be a failsafe level set. There needs to be additional clarification for what happens as a person moves up or down the stairway. (Vote: 8-6)

E32-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202, SECTION 202 (New), 1008.2.1; IFC: SECTION 202, SECTION 202 (New), [BE] 1008.2.1

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Add new definition as follows:

OCCUPANT SENSOR CONTROL ZONE. An area served by one or more light sources simultaneously controlled by one or more occupant sensors.

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. **Exceptions:**

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* ~~adjacent to~~ immediately above and below that *landing*.
   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on the ~~both~~ *landings* ~~adjacent to~~ immediately above and below that *flight*.
   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.
   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.
   1.6. In *interior exit stairways, interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.
2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area

and causes lighting, equipment, or appliances to be regulated accordingly.

Add new definition as follows:

OCCUPANT SENSOR CONTROL ZONE. An area served by one or more light sources simultaneously controlled by one or more occupant sensors.

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit *stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use. **Exceptions:**

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   1.1. When no occupants are present, the illumination level shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
   1.2. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* ~~adjacent to~~ immediately above and below that *landing.*
   1.3. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on the ~~both~~ *landings* ~~adjacent to~~ immediately above and below that *flight*.
   1.4. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.
   1.5. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.
   1.6. In *interior exit stairways, interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:
   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: This revised language was suggested by a committee member during the CAH hearing in Orlando. We believe it helps clarify that light levels need to be increased both above and below an occupant in a stairwell, since people do walk up and down stairs.

This comment also includes the floor modification Bailey-1, adding a definition for OCCUPANT SENSOR CONTROL ZONE, which received strong support from the committee.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of language, not a new requirement.

Comment (CAH2)# 347

Comment 2:

IBC: SECTION 202, SECTION 202 (New), 1008.2.1; IFC: SECTION 202, SECTION 202 (New), [BE] 1008.2.1

Proponents: Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Add new definition as follows:

OCCUPANT SENSOR CONTROL ZONE. . An area served by one or more light sources simultaneously controlled by one or more occupant sensors.

1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, *exit stairways* and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exceptions:

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:
   - 1.1. When no occupants are present on *interior exit stairways*, the illumination level shall be not less than 1 footcandle (11 lux).
   - ~~1.1.~~ 1.2. When no occupants are present, in portions of the *means of egress* other than *interior exit stairways* and where an emergency electrical system is required, the illumination level shall not be less than ~~an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40-to-1 shall not be exceeded.~~ the intial illumination level required in Section 1008.3.2.
   - ~~1.2.~~ 1.3. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* ~~adjacent to~~ immediately above and below that *landing.*
   - ~~1.3.~~ 1.4. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on ~~both~~ *landings* ~~adjacent to~~ immediately above and below that *flight*.
   - ~~1.4.~~ 1.5. Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.
   - ~~1.5.~~ 1.6. After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.
   - ~~1.6.~~ 1.7 In *interior exit stairways, interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

OCCUPANT SENSOR CONTROL. An automatic control device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

Add new definition as follows:

OCCUPANT SENSOR CONTROL ZONE. . An area served by one or more light sources simultaneously controlled by one or more occupant sensors.

[BE] 1008.2.1 Illumination level under normal power. The *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, *exit stairways* and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exceptions:

1. *Occupant sensor controls* shall be permitted to reduce illumination levels along the *means of egress* serving occupied rooms and spaces where the following conditions are met:

   1.1. When no occupants are present on *interior exit stairways*, the illumination level shall be not less than 1 footcandle (11 lux).

   ~~1.1.~~ 1.2. When no occupants are present, in portions of the *means of egress* other than *interior exit stairways* and where an emergency electrical system is required, the illumination level shall not be less than ~~an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.~~ the intial illumination level required in Section 1008.3.2.

   ~~1.2.~~ 1.3. Along *stairways*, when an occupant is present on a *landing*, the illumination level shall be automatically restored on that landing and on all *flights* ~~adjacent to~~ immediately above and below that *landing*.

   ~~1.3.~~ 1.4. Along *stairways*, when an occupant is present on a *flight*, the illumination level shall be automatically restored on that *flight* and on ~~both~~ *landings* immediately above and below ~~adjacent to~~ that *flight*.

   ~~1.4.~~ 1.5 Along the *means of egress* in rooms and spaces other than *stairways*, the illumination level shall be automatically restored in each *occupant sensor* control zone when occupants are present.

   ~~1.5.~~ 1.6 After the occupants leave each *occupant sensor* control zone, the illumination level shall be maintained for no less than 15 minutes.

   ~~1.6.~~ 1.7 In *interior exit stairways, interior exit ramps*, and *exit passageways* in buildings with fire alarm systems, the illumination level shall be automatically restored upon activation of the premises' fire alarm system.

2. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

   2.1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).

   2.2 Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Reason: This proposal modifies the original egress lighting controls proposal E32-24, based on comments from the committee or other commenters and research from other sources.

Incorporating approved changes

Definition of occupant sensor control zone. This definition was added as part of floor modification E32-24-Bailey-MP1 and was non-controversial (no one spoke in opposition to this definition).

Incorporating comments from the committee or commenters

Committee member Fattah suggested using language of "landings immediately above and below that flight" and "flights immediately above and below a landing." This text is editorial in nature and others also thought this was more clear, so this change was incorporated.Commissioners Campbell and Fattah were concerned about stairs having a minimum of 0.1 fc in the stairs when the occupant sensor fails. The low illuminance setting can be considered to be the "fail-safe" illuminance during sensor failure. To address the special concern of light levels in interior exit stairways, this proposal increases by a factor of 10 the minimum unoccupied light levels from 0.1 fc minimum to 1.0 footcandles minimum when no occupants are sensed. 1.0 fc minimum was considered sufficient for stair safety in every version of the IBC prior to 2021, and is also the minimum illuminance which is usually required to charge photoluminescent tape.

Other commenters were concerned about applying the emergency illumination requirements to portions of the means of egress not required to have emergency lighting during occupied periods when no occupancy is detected; in that they expressed concerns about the complexity of calculating the maximum to minimum ratio of 40:1. Currently this calculation of minium to maximum ratios are not required unless the application is required to have emergency power back-up for lighting. This proposal is modified so these unoccupied light levels including maximum to minimum ratios are required only where the emergency lighting is required. Rather than repeating the emergency power initial illumination requirements from Section 1008.3.5, the section is referenced. These minimum light levels provide an additional level of security associated with the operation of the occupancy sensor. Even if the occupancy sensor failed by not detecting occupants, there would still be enough light for egress during normal operation (i.e. utility electrical power is still powering all lighting circuits) comparable to the intial (fully charged) lighting levels provided by the emergency lighting system.

Research from other sources When combined with the other proposals approved by the committee, this proposal aligns the stairway illuminance requirements in IBC Section 1008.2.1 with those in ANSI/ICC 117.1 accessibility standard in Section 504.9.1 "Illumination Level" and in IES-RP-28-20 Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired.

ICC 117.1 also allows 1 fc minimum illumination when the stair is not in use. Similarly in IES RP-28-20, in Table A-1 "Recommended Illuminance Criteria for Spaces Specific to Lighting for Older Adults or Those with Impaired Vision" the table indicates that for exit stairways and landings, the recommended average illuminance value is 10 footcandles and has a footnote with the following instruction: "Measured at the center of the step (If local code permits, stairwell lighting can be reduced when stairwell is unoccupied)."

Research conducted by the Virgina Transportation Technology Institute (Bhagavathula & Gibbons, 2020) evaluated illuminance levels necessary for visibility in parking lots and parking garages. This research informed the recommended illuminance levels in the Illuminating Engineering Society Standard ANSI/IES RP8-22 Recommended Practice: Lighting Roadway and Parking Facilities. In Table 17-3.

Recommended Maintained Illuminance for Parking Garages of IES-RP-8, recommended minimum illuminance in "Dedicated Corners, Ramps; Drive Aisles, Parking Areas" is 0.9 footcandle when active (motion sensed) and 0.2 footcandle when inactive (no motion detected). .The vast majority of outdoor lighting applications are in lighting zones 2 and 3. IES RP 43-22 has recommended upper and lower average recommended maintained illuminance targets in Table A-3. Recommended Illuminance Criteria for People in Outdoor Environments. For Walking Surfaces (general circulation and egress) in lighting zone 2 this range is 1 to 2 fc and in lighting zone 3 this range is 2 to 4 fc. For Stairs and Ramps in lighting zone 2 this range is 2 to 3 fc and in lighting zone 3 this range is 3 to 4 fc. Applying a lower limits of 10 fc average to these outdoor stairs would result in a code minimum that would be higher than the maximum average illumination recommendation from the Illuminating Engineering Society.

Bibliography: ANSI/IES RP-28-20 *Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired.* Illuminating Engineering Society. New York.
ANSI/IES RP-43-22-20 *Recommended Practice: Lighting Exterior Applications.* Illuminating Engineering Society. New York.
ANSI/ICC 117.1 *Accessible and Usable Buildings and Facilities 2017 – 4th Version: Sept 2022* International Code Council. Washington, DC.

Bhagavathula R, Gibbons RB. *Light Levels for Parking Facilities Based on Empirical Evaluation of Visual Performance and User Perceptions*. **LEUKOS**. 2020;16(2):115-36.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impact. Controlling lights with occupancy sensors increases the first cost. However this proposal does not require that occupancy sensors shall be installed. This proposal describes that if one does control lights with occupancy sensors how much the lighting level is allowed to drop.

Comment (CAH2)# 562

E33-24

IBC: 1008.2.1, 1008.2.3; IFC: [BE] 1008.2.1, [BE] 1008.2.3

Proposed Change as Submitted

Proponents: Jack Bailey, One Lux Studio LLC, International Association of Lighting Designers (jbailey@oneluxstudio.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Harold Jepsen, Legrand (harold.jepsen@legrand.us); Marsha K. Mazz, United Spinal Association, United Spinal Association (mmazz@unitedspinal.org); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com)

2024 International Building Code

Revise as follows:

1008.2.1 Illumination level under normal power. The interior *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.1 Illumination level under normal power. The interior *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

[BE] 1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. **Exception:** Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Reason: To reduce the significant environmental impact that results when exterior spaces are over-lighted. Exterior spaces are rarely illuminated to a minimum of 1 footcandle, and exterior exit discharges lighted to meet current requirements in the IBC are unusually bright. This proposal would ensure that light levels which are currently considered sufficient for emergency conditions (refer to Section 1008.3.2) are maintained at all times, which will reduce energy costs and reduce light pollution.

Exterior occupancy sensors are not available for most pedestrian-scale lighting, which means that exit discharge lights will usually burn all night long.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By reducing light level requirements this proposal will result in a reduction in construction costs for many projects as fixtures can be spaced further apart. Construction costs will not be increased for any projects.

E33-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification:

2024 International Building Code

1008.2.1 Illumination level under normal power. The ~~interior~~ *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with *self-luminous* materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

2024 International Fire Code

[BE] 1008.2.1 Illumination level under normal power. The ~~interior~~ *means of egress* illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along *exit access stairways*, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the *stairway* is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is

automatically restored upon activation of a premises' *fire alarm system*:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of *ramps* shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems *listed* in accordance with UL 1994.

Committee Reason: The modification is to delete 'interior' from Section 1008.2.1 was approved so that lighting will still be required on exterior exit stairways or egress balconies. The proposal will clarify requirements for illumination of the path of exit discharge. This is consistent with emergency lighting level. (Vote: 14-0)

E33-24

Individual Consideration Agenda

Comment 1:

IBC: 1008.2.3; IFC: [BE] 1008.2.3

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, National Association of Home Builders (jmunsterteiger@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. ~~A maximum-to-minimum illumination uniformity ratio of 40-to-1 shall not be exceeded.~~

Exception: Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

2024 International Fire Code

Revise as follows:

[BE] 1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the *exit discharge* from each exit to the *public way*. Illumination levels shall not be less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at the walking surface. ~~A maximum-to-minimum illumination uniformity ratio of 40-to-1 shall not be exceeded.~~ **Exception:** Illumination shall not be required where the path of the *exit discharge* meets both of the following requirements:

1. The path of *exit discharge* is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

Reason: The purpose of this committee comment is to strike the uniformity ratio added to the exit discharge requirements by the original

proposal. The proponent's reason statement characterized the change as editorial; however, it is adding new technical requirements to the section, including the calculation of a uniformity ratio, and should have been disapproved on that basis.

While it's true that the uniformity ratio is already in the code, it applies only to the illumination level under emergency power. In this context it is a basic calculation, it's the ratio of when the lights are on versus on only under emergency power. Most of the lighting requiring emergency power is within the building and therefore entirely under the building owner's control.

But adding it to Section 1008.2.3 brings in many variables not within the control of the building's owner and leaves more questions. First is the question of how lighting on neighboring properties or other exterior sources impacts the ratio. The ratio across the exit discharge will be influenced by lighting on neighboring properties, lighting in the public way as well as other environmental factors. This cannot be left open to interpretation at the time of enforcement. The committee disapproved item E34, which was adding ratings for glare across the exit discharge, for this same reason; that it didn't consider light from other external sources.

Another question is the distance across where the ratio of lighting is measured. An exit discharge is not limited in length and can be dozens or even hundreds of yards long. How many points of measurement are taken in that distance to determine the correct ratio? Is it only across the distance of a few feet or across its entire length and width? How does it account for the changing landscape, such as trees with or without leaves blocking overhead lighting? This also cannot be left open to interpretation at the time of enforcement.

It is for these reasons that the ratio in the original proposal should be stricken.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

By removing the ratio calculation this proposal will have little cost impact. With it in place the costs could be incalculable as a permit holder attempts to comply and pass inspections.

Comment (CAH2)# 275

E35-24

IBC: 1008.3; IFC: [BE] 1008.3

Proposed Change as Submitted

Proponents: Lucas Pump, City of Cedar Rapids, Self (l.pump@cedar-rapids.org)

2024 International Building Code

Revise as follows:

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3. Exit passageways.
   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms ~~with and area greater then 300 square feet (27.87 m^2).~~

2024 International Fire Code

Revise as follows:

[BE] 1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more *exits* or access to *exits*:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.

2. In buildings that require two or more *exits* or access to *exits*:
   2.1. *Interior exit access stairways* and *ramps*.
   2.2. *Interior* and *exterior exit stairways* and *ramps*.
   2.3. *Exit passageways*.
   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. Fire command centers.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms ~~with an area greater than 300 square feet (27.87 m^2).~~

Reason: The deleting of this text of the square footage would require emergency lighting in all public restrooms. Public restrooms typically do not contain natural lighting, and when the electrical power goes out, these restrooms become completely black. Furthermore, a public restroom is usually not a familiar place, therefore safely exiting these spaces can be very difficult in an emergency situation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The cost increase would be negligible because the average emergency light cost is between $20-$60 USD.

Estimated Immediate Cost Impact Justification (methodology and variables):

This would increase the cost of construction as emergency lighting would be required in all public restrooms, although the cost increase would be negligible because the average emergency light cost is between $20-$60 USD.

Estimated Life Cycle Cost Impact:

$20-$60 USD per new public restroom

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Safety of occupants of the building

E35-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The original requirement was for multi-stall toilet rooms. Why is emergency lighting required in single occupant restroom where there might not be emergency lighting required in the space the toilet room was located in? As written this would require emergency lighting on individual stalls where the compartments extended floor to ceiling - that is a very high cost with minimal gain. (Vote: 11-3)

Individual Consideration Agenda

Comment 1:

IBC: 1008.3; IFC: [BE] 1008.3

Proponents: Lucas Pump, City of Cedar Rapids, Self (l.pump@cedar-rapids.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3. Exit passageways.
   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. ~~Public restrooms with an area greater than 300 square feet (27.87 m^2)~~ Common areas of multi-stall toilet and bathing rooms.

2024 International Fire Code

[BE] 1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more *exits* or access to *exits*:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In buildings that require two or more *exits* or access to *exits*:
   2.1. *Interior exit access stairways* and *ramps*.
   2.2. *Interior* and *exterior exit stairways* and *ramps*.
   2.3. *Exit passageways*.
   2.4. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. Fire command centers.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. ~~Public restrooms with an area greater than 300 square feet (27.87 m^2)~~ Common areas of multi-stall toilet and bathing rooms.

Reason: The feedback at the Committee Action Hearings was that a single user restroom shouldn't be required to provide emergency lighting as the original intent of the code was for multi-user restroom where you might have several occupants that need to safely egress. Further testimony at the Hearings indicated that as written in the original proposal, a Building Official may interpret that every stall of a single user gender neutral restroom would need an emergency lighting because the stall partitions are floor to ceiling. This code change eliminates the arbitrary size of 300 sq. ft., which is not referenced anywhere else in the code. Public restrooms typically do not contain natural lighting, and when the electrical power goes out, these restrooms become completely black. Furthermore, a public restroom is usually not a familiar place, therefore safely exiting these spaces can be very difficult in an emergency situation. This comment fixes the concerns of the committee as well as the testimony in opposition.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost increase would be negligible because the average emergency light cost is between $20-$60 USD, and would only now require emergency lighting on a small percentage of new restrooms.

Estimated Immediate Cost Impact Justification (methodology and variables):

Safety of occupants of the occupants in public restroom.

Estimated Life Cycle Cost Impact:

There would be a slight increase due to maintain of the lighting as well as replacement of the back-up battery.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Safety of occupants of the building

Comment (CAH2)# 33

E38-24

IBC: 1009.2, 1009.7; IFC: [BE] 1009.2, [BE] 1009.7

Proposed Change as Submitted

Proponents: David Renn, PE, SE, City and County of Denver, Colorado Chapter Code Development Committee (david.renn@denvergov.org)

2024 International Building Code

Revise as follows:

1009.2 Continuity and components. Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge*.

1009.7 Exterior areas for assisted rescue. Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served, shall be located on the exterior landing adjacent to an *exit*, and shall comply with Sections 1009.7.1 through 1009.7.4. ~~.Where the *exit discharge* does not include an *accessible route* from an exit located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.~~

2024 International Fire Code

Revise as follows:

[BE] 1009.2 Continuity and components. Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104 of the International Building Code.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.

4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge*.

[BE] 1009.7 Exterior areas for assisted rescue. Exterior areas for assisted rescue shall be accessed by an *accessible route* from the area served, shall be located on the exterior landing adjacent to an *exit*, and shall comply with Sections 1009.7.1 through 1009.7.4. ~~.Where the *exit discharge* does not include an *accessible route* from an *exit* located on the *level of exit discharge* to a *public way*, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.~~

Reason: Section 1009.7 currently requires an exterior area for assisted rescue where the exit discharge does not include an accessible route from the exit to a public way. This requirement is essentially an exception to 1009.2 that requires an accessible means of egress (AMOE) to be continuous to the public way. Also, the exception to Section 1009.6.2 was added to allow an interior area of refuge at the level of exit discharge to act the same as an exterior area of rescue assistance - both provide a protected space where persons with physical disabilities can wait for an assisted rescue by an emergency responder. The exception to 1009.6.2 doesn't specifically say the AMOE does not need an accessible route to the public way, but that is clearly the intent since there would be no other reason to provide such an area of refuge. Also, the commentary to Section 1009.7 discusses both an exterior area for assisted rescue and an interior area of refuge and indicates they both are an option to not providing an AMOE that is continuous to the public way.

To clarify the continuity requirements for an exterior area for assisted rescue and an interior area of refuge at the level of exit discharge, this proposal adds an exception to the continuity requirement in 1009.2 and deletes the implied exception in 1009.7 since it would be redundant.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal clarifies the intent of the code with regard to continuity requirements for assisted rescue components of the accessible means of egress, so there will be no cost impact.

E38-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The continuity requirements are moved from Section 1009.7 and allows for an exception for an accessible route to the public way from both options at the level of exit discharge where an accessible route is not available to the public way. This proposal is preferred over E37-24. (Vote: 14-0)

Individual Consideration Agenda

Comment 1:

IBC: 1009.2; IFC: [BE] 1009.2

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

1009.2 Continuity and components. Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.
4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge*.
3. Interior exit stairways complying with Sections 1009.3 and 1023.
4. Exit access stairways complying with Sections 1009.3 and 1019.3 or 1019.4.
5. Exterior exit stairways complying with Section 1009.4.

2024 International Fire Code

[BE] 1009.2 Continuity and components. Each required *accessible means of egress* shall be continuous to a *public way* and shall consist of one or more of the following components:

1. *Accessible routes* complying with Section 1104 of the International Building Code.
2. *Interior exit stairways* complying with Sections 1009.3 and 1023.
3. *Exit access stairways* complying with Sections 1009.3 and 1019.3 or 1019.4.

4. *Exterior exit stairways* complying with Sections 1009.3 and 1027 and serving levels other than the *level of exit discharge*.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. *Horizontal exits* complying with Section 1026.
8. *Ramps* complying with Section 1012.
9. *Areas of refuge* complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving *exits* at the *level of exit discharge*.

Exception: An *accessible means of egress* that ends at one of the following components is not required to be continuous to a *public way*:

1. *Area of refuge* complying with Section 1009.6 at the *level of exit discharge* that provides direct access to an exterior *exit* door.
2. Exterior area for assisted rescue complying with Section 1009.7 serving an *exit* at the *level of exit discharge*.
3. Interior exit stairways complying with Sections 1009.3 and 1023.
4. Exit access stairways complying with Sections 1009.3 and 1019.3 or 1019.4.
5. Exterior exit stairways complying with Section 1009.4.

Reason: The committee preferred the wording and format for E38 over E37. However, E38 did not go far enough. While it includes two of the obvious elements where the continuity of accessible egress can be stopped, it did not include stairways, and obvious obstruction and impediment to free accessible egress. While E37 was attempting to do other things as well as this, the opportunity to include these elements in the exception should be taken. It is clear that the accessible route from stairways stops at the stairway, whether they have areas of refuge of not within them.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The question of where to end the accessible means of egress were the path is not continuous to the public way needs clarity. The original proposal and this modification seek to accomplish that clarification. As such, there is no associated cost.

Comment (CAH2)# 689

E41-24

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1009.2.1 Elevators required. In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4. **Exceptions:**

1. ~~In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the~~ The elevator shall not be required as part of the *accessible means of egress* ~~on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.~~ where the building complies with all of the following:
   1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   1.2. All floors above the level of exit discharge are provided with a horizontal exit.
   1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.

2024 International Fire Code

Revise as follows:

[BE] 1009.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4. **Exceptions:**

1. ~~In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the~~ The elevator shall not be required as part of the *accessible means of egress* ~~on floors provided with a *horizontal exit* and located at or above the *levels of exit discharge*.~~ where the building complies with all of the following:
   1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   1.2. All floors above the level of exit discharge are provided with a horizontal exit.
   1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

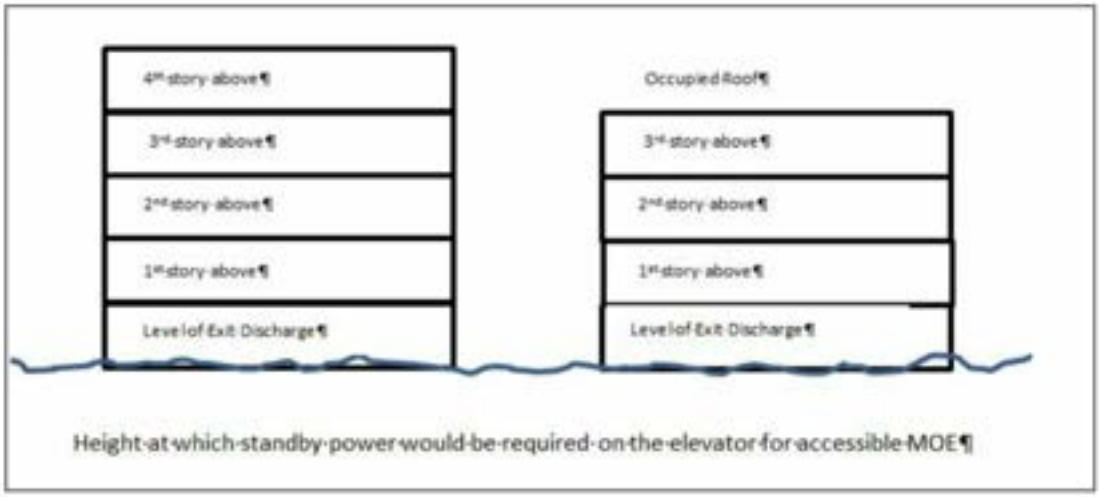
Reason: The intent of this proposal is to address buildings that have an occupiable roof and to allow for those buildings to use the option

of elevators with standby power (required in Section 1009.4) or to allow the use of horizontal exits. The reformatting is for ease of use and clarity. The new requirement for occupiable roofs is addressed in 1.3.

Horizontal exits on floors provide protected areas for people to wait for fire department assisted rescue if they need it.

With the addition of 1.3, people on the occupied roofs would be protected from smoke and fumes by being open to the air. If the people enter directly into enclosed exit stairways, they are protected to the level of exit discharge. These are sprinklered buildings, so no interior areas of refuge are required. The horizontal exits below allow for slower evacuation time, so the fire department can have additional time to assist anyone on the roof. Section 1006.3 considers occupiable roofs as a story for means of egress, so there will always be at least two ways off.

The Egress committee (E31-21) raised some concerns last cycle which this proposal addresses . The concern as to the location of the horizontal exit on the level below the occupied roof is immaterial because the occupants will already be within a protected exit enclosure. Following, there is not a concern of an occupant traveling down to the fire side of a horizontal exit on the floor below with the use of an exit access stairway or ramp.



This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Occupiable roofs were added to Section 1009.2 by E30-18. This clarifies an option for accessible means of egress for building with occupiable roofs.

E41-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This clarification is needed to address occupied roofs. However, the exception does not address what happens in

the basement levels - either address these or limit the exception to above grade. (Vote: 14-0)

E41-24

Individual Consideration Agenda

Comment 1:

IBC: 1009.2.1; IFC: [BE] 1009.2.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1009.2.1 Elevators required. In *buildings* where a required *accessible* floor is four or more *stories* above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a *story* that is three or more *stories* above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4. **Exceptions:**

1. The elevator shall not be required as part of the *accessible means of egress* where the building complies with all of the following:
   1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   1.2. All floors above or below the level of exit discharge are provided with a horizontal exit.
   1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.
2. In *buildings* equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a ramp conforming to the provisions of Section 1012.

2024 International Fire Code

[BE] 1009.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a *level of exit discharge* or where an accessible *occupiable roof* is above a story that is three or more stories above the *level of exit discharge* , not less than one required *accessible means of egress* shall include an elevator complying with Section 1009.4. **Exceptions:**

1. The elevator shall not be required as part of the *accessible means of egress* where the building complies with all of the following:
   1.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   1.2. All floors above or below the level of exit discharge are provided with a horizontal exit.
   1.3. Where there is an occupiable roof, the means of egress serving the occupiable roof is provided by interior exit stairways or ramps complying with Section 1023.
2. In buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the *accessible means of egress* on floors or *occupiable roofs* provided with a *ramp* conforming to the provisions of Section 1012.

Reason: The revision to the proposal is to address a concern brought up during the testimony at the spring hearings. "Or below" was pointed out as a miss and has been corrected.

Please see the reason for the original proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Occupiable roofs were added to Section 1009.2 by E30-18. This clarifies an option for accessible means of egress for building with occupiable roofs.

Comment (CAH2)# 220

E44-24

IBC: 1009.3; IFC: [BE] 1009.3

Proposed Change as Submitted

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ICC A117.1 and Sections 1009.3.1 through 1009.3.3. **Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.

2024 International Fire Code

Revise as follows:

[BE] 1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ICC A117.1 and Sections 1009.3.1 through 1009.3.3. **Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.

Reason: While many of the accessibility related provisions of the A117.1 and ADA Standards have been mainstreamed into the IBC, some have not. The IBC includes provisions for stairs assuming the broad population as a whole. The A117.1 looks at these elements for their unique qualities as they relate to people with limited mobility and limited vision capabilities. The A117.1 standards are based on review of ergonomic data and actual fall and accident events as well as a comparison to other accessibility standards around the world. The A117.1 standard is better equipped to address the needs and concerns for people with disabilities.

As most of the requirements are the same and IBC Section 102.4 states that where conflicts exist between the code and a standard, the code shall prevail, the impact will be largely for the visual contrast at stair nosings. Visual contrast is especially important for people with limited vision and for people who are not functioning to their highest mental capability due to medication, intoxication or medical cognition.

The exception acknowledges the fact that the IBC contains a number of exceptions for stairs within dwelling units; and, that many people will not desire some of the A117.1 requirements for stairs within Type A and Type B units, as well as those not required to be Type A or Type B, since the A117.1 includes requirements for handrail extensions, and contrasting stripes. Since Type A and Type B units are adaptable, it seems reasonable that these elements could be added at a time when the occupant requires such features.

When evaluating the differences between the IBC requirements for stairways and the A117.1 requirements, the following table identifies the similarities and differences. Below each item is a notation about which is more restrictive or contains more criteria for compliance.

AMOE Stairways.

Requirement	IBC	A117.1
Riser Height (same)	4" min – 7" max	4" min – 7" max
Tread depth (same)	11" min	11" min
Open Risers (same)	Not required where stair is part of accessible means of egress.	Not Permitted
Tread surface (same)	Max opening of ½", securely attached, with slope not steeper than 1:48.	Max opening of 1/2", firm, stable, slip resistant and slope not steeper than 1:48
Tread and Riser uniformity (IBC)	Very Specific criteria for how uniformity is measured to adjacent steps and overall	All must be "uniform"
Nosing profile (A117.1)	9/16" max radius, underside at 30 degrees (no language about beveled nosings)	½" radius, ½" bevel, underside at 30 degrees max to vertical
Nosing depth (IBC)	1-1/4" max	1-1/2" max
Landings (IBC)	Specific criteria	No criteria
Visual contrast (A117.1)	Luminescent marking for high-rise buildings.	One of the following: 1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing, measured horizontally from the leading edge of the nosing, shall consist of a solid color having visual contrast of dark-on-light or light-on-dark from the remainder of the tread. The contrasting marking shall be durable and shall extend from one side of each tread to the other side of each tread. 2. Durable distinctive warning markings required by the adopted building code or ANSI safety standard.
Handrails (A117.1)	Required on both sides with some exceptions for short stairs and inside dwelling units.	Required on both sides, except for dwelling units NOT required to be Accessible.
Wet conditions (same)	Designed not to allow water accumulation.	Designed not to allow water accumulation.
Maxi. rise between landings (IBC)	12 feet vertical	Not addressed

Requirement	IBC	A117.1
Lighting (IBC)	The means of egress illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along exit access stairways, exit stairways and at their required landings, the illumination level shall not be less than 10 footcandles (108 lux) at the walking surface when the stairway is in use.	1. A 1-foot-candle (10.8 lux) minimum illumination at times other than conditions of stair use 2. A 10-foot-candle (108 lux) minimum illumination during conditions of stair use 3. The transition from 1 foot candle (10.8 lux) to 10 foot candle (108 lux) under conditions of stair use shall be permitted to be achieved by automatic, motion sensor-type lighting switches provided the switch controllers comply with all of the following: 3.1 The switch controllers are equipped for fail-safe operation and evaluated for this purpose 3.2 The motion sensor is activated by occupant movement on the stair or stair landings 3.3 The illumination timers are set for a minimum 15-minute duration.
Signage within Stair enclosure (A117.1)	"1023.11 Tactile floor-level signs. Where floor level signs are provided in interior exit stairways and ramps, a floor-level sign identifying the floor level in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor-level landing adjacent to the door leading from the interior exit stairway and ramp into the corridor."	"Stair level identification signs in raised characters and braille complying with [A117.1] Sections 703.3 and 703.4 shall be located at each floor level landing in all enclosed stairways adjacent to the door leading from the stairwell into the corridor to identify the floor level. The exit door discharging to the outside or to the level of exit discharge shall have a sign with raised characters and braille stating "EXIT.""
Signage at exits (IBC – includes horizontal exits)	"Where exit signs are provided at an area of refuge with direct access to a stairway, an exterior area for assisted rescue, an exit stairway or ramp, an exit passageway, a horizontal exit and	"A sign stating EXIT in raised characters and Braille and complying with [A117.1] Sections 703.3 and 703.4 shall be provided adjacent to each door to an area of refuge

Requirement	IBC	A117.1
	the exit discharge, a sign stating "EXIT" in visual characters, raised characters and braille and complying with ICC A117.1 shall be provided."	providing direct access to a stairway, an exterior area for assisted rescue, an exit stairway, an exit ramp, an exit passageway and the exit discharge."

Bibliography: IBC - 2024

ICC A117.1 - 2017, Supplement

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The additional material cost to adding a stripe to the tread can be as little as $0.02 is it involves paint or $0.70 per tread for adhesive-type anti-slip tape applications. For a 4 story building with two exit stairways, the anti-slip application would increase the material cost by less than $100 for the entire project.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost would be minimal. Most of the differences are in the details which would not affect cost. The only item which would be a cost

increase is the visual contrast marking. In many facilities, this is already installed for general safety reasons and is therefore no cost at all.

Estimated Life Cycle Cost Impact:

Depending on the material used the life cycle costs could be $0 or an estimated $100 every 6-10 years.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Variables include the type of materials originally used for contrast and the types of materials used for maintaining the contrasting stripes as well as teh frequency of maintenance - also dependent on the materials selected.

E44-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Contrast on stairways should be addressed directly in the code. A reference to ICC A117.1 for this would cause confusion. (Vote: 14-0)

E44-24

Individual Consideration Agenda

Comment 1:

IBC: 1009.3, 1009.3.3 (New); IFC: [BE] 1009.3, [BE] 1009.3.3 (New)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. **~~Exception:~~** ~~Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

1009.3.3 Visual contrast markings. Visual contrast markings shall comply with either 1 or 2:

1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing, measured horizontally from the leading edge of the nosing, shall consist of a solid color having visual contrast of dark-on-light or light-on-dark from the remainder of the tread. The contrasting marking shall be durable and shall extend from one side of each tread to the other side of each tread.
2. Required distinctive warning and photoluminescent markings.

[BE] 1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. **~~Exception:~~** ~~Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

[BE] 1009.3.3 Visual contrast markings. Visual contrast markings shall comply with either 1 or 2:

1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing, measured horizontally from the leading edge of the nosing, shall consist of a solid color having visual contrast of dark-on-light or light-on-dark from the remainder of the tread. The contrasting marking shall be durable and shall extend from one side of each tread to the other side of each tread.
2. Required distinctive warning and photoluminescent markings.

Reason: The stated reason of the original proposal was to add the visual contrast requirements for stairs from the A117.1 standard to the IBC. The simple reference to the A117.1 standard invoked conflicting requirements within chapter 10 Means of Egress as well as chapter 11 of the IBC where accessibility is scoped. The referenced standard has been delteted.

This comment simply incorporates the language of the current A117.1 standard regarding contrast markings at stairs.

This comment is one of several dealing with the need for contrast markings on stairways and resolves the intent of the original proposal as the committee suggested without unnecessary or controversial reference to the A117.1 standard.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Labor and materials to apply the contrast strip will vary greatly depending on the durability desired any where from $10 to $100 + per stripe. The less expensive options of paint or tape will wear and need to be maintained on not less than an annual basis for all but the lesser used stairways.

Estimated Immediate Cost Impact Justification (methodology and variables):

Less durable must be maintained or replaced annually- Paint or tape $1 - $5 material, Labor $5 - $10 per stripe

Most durable typically permanent - Mechanically fastened or inlaid stripe $20 -$30+, Labor $25 - $75 per stripe

Estimated Life Cycle Cost Impact:

Stairs are typically rarely replaced in a building. The life cycle of a stair is that of the building where it is located.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Less Durable - $10 x 16 stripes per stair x 50 years = $8000 per stair/50year (inflation not factored)

More to Most Durable - $100 x 16 stripes per stair = $1600 per stair one time expense

Comment (CAH2)# 57

Comment 2:

IBC: 1009.3, 1009.3.3 (New); IFC: [BE] 1009.3, [BE] 1009.3.3 (New)

Proponents: Ashley Goodin, Technical Services, Stairbuilders and Manufacturers Association (ashley.goodin@stairways.org); David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. ~~**Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

1009.3.3 Contrast marking stripe. A contrast marking stripe shall be provided on each tread and landing *nosing* such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm) and not more than 2 inches (51 mm) wide. **Exception:** The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

2024 International Fire Code

[BE] 1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. ~~**Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

[BE] 1009.3.3 Contrast marking stripe. A contrast marking stripe shall be provided on each tread and landing *nosing* such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm) and not more than 2 inches (51 mm) wide. **Exception:** The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

Reason: The stated reason of the original proposal was to add the visual contrast requirements for stairs from the A117.1 standard to the IBC. The simple reference to the A117.1 standard invoked conflicting requirements within chapter 10 Means of Egress as well as chapter 11 of the IBC where accessibility is scoped.

This comment is one of several dealing with the need for contrast markings on stairways and resolves the intent of the original proposal as the committee suggested without unnecessary or controversial reference to the A117.1 standard by simply incorporating existing text from Section 1030 Assembly as shown below.

> **1030.14.2.3 Tread contrasting marking stripe.** A contrasting marking stripe shall be provided on each tread at the *nosing* or leading edge such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm) and not more than 2 inches (51 mm) wide.
>
> **Exception:**The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

The text was modified slightly in this comment to include the marking of landing nosings as well as tread nosings. Approval of this change would incorporate a requirement that has proven to be consistently enforceable in similar application.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Labor and materials to apply the contrast strip will vary greatly depending on the durability desired any where from $10 to $100 + per stripe. The less expensive options of paint or tape will wear and need to be maintained on not less than an annual basis for all but the lesser used stairways.

Estimated Immediate Cost Impact Justification (methodology and variables):

Less durable must be maintained or replaced annually- Paint or tape $1 - $5 material, Labor $5 - $10 per stripe
Most durable typically permanent - Mechanically fastened or inlaid stripe $20 -$30+, Labor $25 - $75 per stripe

Estimated Life Cycle Cost Impact:

Stairs are typically rarely replaced in a building. The life cycle of a stair is that of the building where it is located.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Less Durable - $10 x 16 stripes per stair x 50 years = $8000 per stair/50year (inflation not factored)
More to Most Durable - $100 x 16 stripes per stair = $1600 per stair one time expense

Comment (CAH2)# 59

Comment 3:

IBC: 1009.3, 1009.3.3 (New); IFC: [BE] 1009.3, [BE] 1009.3.3 (New)

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org); Paul Wishnoff, United Rockland Stairs, Self (pwishnoff@unitedrocklandstairs.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. ~~**Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

1009.3.3 Visual contrast markings. Visual contrast markings shall comply with either 1 or 2:

1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing nosing shall include a solid color marking stripe having visual contrast of dark-on-light or light-on-dark from the background. The contrasting marking shall be uniform, located not more than 1/2 inch from the leading edge, and extend the full width of the stair.
2. Required distinctive warning and photoluminescent markings.

2024 International Fire Code

[BE] 1009.3 Stairways. In order to be considered part of an *accessible means of egress*, a *stairway* between *stories* shall comply with ~~ICC A117.1 and~~ Sections 1009.3.1 through 1009.3.~~3~~4. ~~**Exception:** Stairways within dwelling units or sleeping units, other than Accessible dwelling or sleeping unit, shall not be required to comply with ICC A117.1.~~

Add new text as follows:

[BE] 1009.3.3 Visual contrast markings. Visual contrast markings shall comply with either 1 or 2:

1. The leading 1 to 2 inches (25 to 51 mm) of every tread and landing nosing shall include a solid color marking stripe having visual contrast of dark-on-light or light-on-dark from the background. The contrasting marking shall be uniform, located not more than 1/2 inch from the leading edge, and extend the full width of the stair.
2. Required distinctive warning and photoluminescent markings.

Reason: The stated reason of the original proposal was to add the visual contrast requirements for stairs from the A117.1 standard to the IBC. The simple reference to the A117.1 standard invoked conflicting requirements within chapter 10 Means of Egress as well as chapter 11 of the IBC where accessibility is scoped. The referenced standard has been delteted.

This comment is a composite of current A117.1, E73, and New version of the A117.1 as currently being developed without a contrast formula.

This comment is one of several dealing with the need for contrast markings on stairways and resolves the intent of the original proposal as the committee suggested without unnecessary or controversial reference to the A117.1 standard.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Labor and materials to apply the contrast strip will vary greatly depending on the durability desired any where from $10 to $100 + per stripe. The less expensive options of paint or tape will wear and need to be maintained on not less than an annual basis for all but the lesser used stairways.

Estimated Immediate Cost Impact Justification (methodology and variables):

Less durable must be maintained or replaced annually- Paint or tape $1 - $5 material, Labor $5 - $10 per stripe
Most durable typically permanent - Mechanically fastened or inlaid stripe $20 -$30+, Labor $25 - $75 per stripe

Estimated Life Cycle Cost Impact:

Stairs are typically rarely replaced in a building. The life cycle of a stair is that of the building where it is located.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Less Durable - $10 x 16 stripes per stair x 50 years = $8000 per stair/50year (inflation not factored)
More to Most Durable - $100 x 16 stripes per stair = $1600 per stair one time expense

Comment (CAH2)# 60

E48-24

IBC: SECTION 202 (New), 1010.1.4, 1010.1.6, 1011.5.5.2, 1011.6, 1011.8, 1011.14, 1027.3; IFC: SECTION 202 (New), [BE] 1010.1.4, [BE] 1010.1.6, [BE] 1011.5.5.2, [BE] 1011.6, [BE] 1011.8, [BE] 1011.14, [BE] 1027.3

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Add new definition as follows:

LANDING. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or elevator.

Revise as follows:

1010.1.4 Floor elevation. There shall be a ~~floor or~~ landing on each side of a door. Such ~~floor or~~ landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall not be more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than $7\,^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the ~~finished floor or~~ landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the ~~finished floor or~~ landing for other doors. Raised thresholds and ~~floor level~~ changes of level greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope). **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^{3}/_{4}$ inches (197 mm) in height if all of the following apply:

   1.1. The door is not part of the required *means of egress*.

   1.2. The door is not part of an *accessible route* as required by Chapter 11.

   1.3. The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.

2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^{3}/_{4}$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^{1}/_{2}$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projection~~s~~ of the *nosing~~s~~* of the ~~floor or~~ landing at the top of a *flight*.

1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between ~~floor levels or~~ landings.

Exception: *Spiral stairways* used as a *means of egress* from *technical production areas*.

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in *buildings* of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in *buildings* of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between ~~floor levels or~~ landings.

1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and *guards*. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to ~~each floor level and~~ the level of each ~~intermediate~~ landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

2024 International Fire Code

Add new definition as follows:

LANDING. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or elevator.

Revise as follows:

[BE] 1010.1.4 Floor elevation. There shall be a ~~floor or~~ landing on each side of a door. Such ~~floor or~~ landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7\frac{3}{4}$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $\frac{1}{2}$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Thresholds. Thresholds at doorways shall not exceed $\frac{3}{4}$ inch (19.1 mm) in height above the ~~finished floor or~~ landing for sliding doors serving *dwelling units* or $\frac{1}{2}$ inch (12.7 mm) above the ~~finished floor or~~ landing for other doors. Raised thresholds and ~~floor level~~ changes <u>of level</u> greater than $\frac{1}{4}$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope). **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7\frac{3}{4}$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11 of the International Building Code.
   1.3. The door is not part of an accessible unit, Type A unit or Type B unit.
2. In Type B units, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4\frac{3}{4}$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4\frac{1}{2}$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projections of the *nosings* of the ~~floor or~~ landing at the top of a *flight*.

[BE] 1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.

2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing*and the intersection of the walkline of the upper *flight* at the *nosing*of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between ~~floor levels or~~ landings.

Exception: *Spiral stairways* used as a *means of egress* from technical production areas.

[BE] 1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between ~~floor levels or~~ landings.

[BE] 1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and guards. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to ~~each floor level and~~ the level of each ~~intermediate~~ landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

Reason: What is the difference between a landing and a floor? There is clearly a difference that is not understood. An entire floor is not a landing, but the code uses the term “floor-or-landing” as if they are the same. In other instances, such as in **1027.3 Open side**, the two terms used confusingly allow the required open side to be located anywhere on the floor level as opposed to at the landing, as if they might be considered to be uniquely different locations. The confused use of the terms interchangeably is due to the lack of a definition for either floor or landing.

Is it a "landing", a "floor", or is it a "floor-or-landing"?

A landing is but a portion of a floor. The attribute of size is not addressed in dictionaries and this alone is justification for a unique definition in the code. A landing may not be a floor at all if it is not at a floor level but only located between flights or at a mezzanine. If it is a landing, the current code does not require it between flights. Landings are only required at the top and bottom of stairways. But that is an issue we will discuss in a separate code change related to the definition of stairway.

If it is a deck or patio connected to the structure, is it a floor or landing? Clearly only enough area is needed to safely access or depart from the door or flight of stairs. The code, however, provides an option for a floor of indefinite size though only a landing is needed. An entire floor is not necessary to enter or exit a stairway. If a floor is provided instead of a landing, is it limited to the size of a landing or what portion of the floor is the landing? This same circular rhetoric could be applied to landings at elevators as well.

How big is a floor or should I ask is there a need to describe the limits of a floor's size? If you could define "floor", it would likely not be in terms of its size? A landing is much different. The code specifies landing sizes throughout the code, albeit, sometimes indirectly as related to egress capacity. This alone makes a landing uniquely different from a floor.

The limit of a landing’s size is what defines where the stairway ends and where a floor begins. This is important because the width, depth, and headroom of landings are uniquely regulated within **1011 Stairways**. The suggested definition clearly identifies the unique quality of landing size as *"The portion of a walking surface required..."* and quantifies the landing as the amount of space needed to perform the functions of a landing, e.g., change in direction, change in stride, rest, or simply provide the area required to enter or exit a doorway, stair, ramp or elevator.

In addition to the definition, we have included comprehensive changes to all the requirements with instances of confusing reference to the terms floor or landing based upon a search of the IBC. Each has been corrected by deleting floor where "floor or landing" has been used and any related contextual changes necessary. Each of these necessary changes to the code are very clear examples of how the suggested definition for landing can simplify code language and provide for consistent interpretation.

In an effort to correlate with the A117.1 standard the proposed definition has been submitted and approved in the proceedings of the

A117.1 committee for inclusion in the final ballot of the ICC A117.1 Standard expected in 2024. The text is the same except that "door" is deleted as landings at doors are not mentioned in A117.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a new definition and editorial changed needed to correlate with other ICC defined terminology. The changes have no material affect upon the cost of construction.

E48-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. This is not an issue - changing this will cause confusion. Removing "floor" would add confusion for threshold measurements in Section 1010.1.6. Landings are part of a floor, so they can be the same location. There are not boundary explanation on where a landing ends and a floor would start. (Vote: 13-1)

E48-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202, 1010.1.4, 1010.1.6, 1011.5.5.2, 1011.6, 1011.8, 1011.14, 1027.3; IFC: SECTION 202, [BE] 1010.1.4, [BE] 1010.1.6, [BE] 1011.5.5.2, [BE] 1011.6, [BE] 1011.8, [BE] 1011.14, [BE] 1027.3

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

LANDING. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or elevator.

1010.1.4 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall not be more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.

3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes ~~of level~~ greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope). **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1.The door is not part of the required *means of egress*.1.2.The door is not part of an *accessible route* as required by Chapter 11.1.3.The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.
2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^3/_4$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^1/_2$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projection of the *nosing* of the landing at the top of a *flight*.

1011.6 Stairway landings. There shall be a landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between landings.

Exception: *Spiral stairways* used as a *means of egress* from *technical production areas*.

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in *buildings* of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in *buildings* of

Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between landings.

1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and *guards*. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

2024 International Fire Code

LANDING. The portion of a walking surface required for direct access to or from an adjacent, door, stair, flight of stairs, ramp run, or elevator.

[BE] 1010.1.4 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7\,^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B *dwelling units* or *sleeping units*, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the *dwelling unit* or *sleeping unit*.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes ~~of level~~ greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7\,^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11 of the International Building Code.
   1.3. The door is not part of an accessible unit, Type A unit or Type B unit.

2. In Type B units, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^{3}/_{4}$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^{1}/_{2}$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projections of the *nosings* of the landing at the top of a *flight*.

[BE] 1011.6 Stairway landings. There shall be a landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.8 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between landings.

Exception: *Spiral stairways* used as a *means of egress* from technical production areas.

[BE] 1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a *mezzanine* not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between landings.

[BE] 1027.3 Open side. *Exterior exit stairways* and *ramps* serving as an element of a required *means of egress* shall be open on not less than one side, except for required structural columns, beams, *handrails* and *guards*. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

Reason: Where the committee felt that the text deleted in sections 1010.4, 1010.6 and 1027.3 aided understanding this comment modifies the original proposal and returns the text maintaining these sections unchanged.

In accordance with the committees approval of E69-24 stairway has been replaced with "flight of stairs" and "floor or" remains deleted at 1011.6 Stairway landing and 1011.5.5.2 Nosing projection uniformity. In these locations a landing of specific size is required by the code. The code prescribes a specific area described by the width and depth requirements in 1011.6 that must meet other requirements such as headroom, slope, illumination. The landings and flights required from one level to another are defined as the components of a stairway with unique requirements that do not apply to floors. A floor has no limits of size nor is the slope of the walking surface regulated as is a landing. Allowing a floor to be substituted for the required landing offers a loophole to compliance, and confuses interpretation. Clearly distinguishing the landing from the remaining walking surface at a floor level will be of considerable consequence in relation to the illumination proposals approved at CAH1.

Also 1011.6 Stairway landings provides the specific requirements for the size of all stairway landings whether between flights within a stairway or at a floor level. E69-24 as approved at CAH1 is shown below:

1011.6 Stairway landings. There shall be a landing at the top and bottom of each flight of stairs. The **width of landings**, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of the flight served. Where there is a change in direction of the stairway at the landing, **the landing depth** shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **<emphasis added>**

Clearly the problem is further exacerbated without a definition of landing as a portion of a walking surface. The landing must be understood to be a portion of the walking surface which may or may not be a floor at all as in the case of a sidewalk, driveway, etc. The definition of landing as a portion of the walking surface is essential to provide for consistent enforcement and interpretation of those requirements that are uniquely different from floors.
This comment addresses the committee's request for us to bring the definition back and retain the references to floor and finished floor where it had been deleted in sections related to doors. Please approve as modified by this comment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a new definition and editorial changed needed to correlate with other ICC defined terminology. The changes have no material affect upon the cost of construction.

Comment (CAH2)# 86

E49-24

IBC: 1010.1.4, 1010.1.6; IFC: [BE] 1010.1.4, [BE] 1010.1.6

Proposed Change as Submitted

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2024 International Building Code

Revise as follows:

1010.1.4 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall not be more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be *Accessible units*, *Type A units* or *Type B units*, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units or sleeping units, that have impervious surfaces shall be permitted for the exterior surface to be ~~and that are~~ not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit or *sleeping unit*. or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5, whichever is greater.
6. Doors serving equipment spaces not required to be *accessible* in accordance with Section 1103.2.9 and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope). **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11.
   1.3. The door is not part of an *Accessible unit*, *Type A unit* or *Type B unit*.
2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 43/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 41/2 inches (114 mm) above the exterior deck, patio or balcony for other doors or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5, whichever is greater.

2024 International Fire Code

Revise as follows:

[BE] 1010.1.4 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope). **Exceptions:**

1. At doors serving individual *dwelling units* or *sleeping units* in Groups R-2 and R-3, a door is permitted to open at the top step of an interior *flight* of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an *accessible route*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual *dwelling units* and *sleeping units* in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units or sleeping units, that have impervious surfaces shall be permitted for the exterior surface to be ~~and that are~~ not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit or *sleeping unit*. or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5 of the *International Building Code*, whichever is greater.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an *occupant load* of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving *dwelling units* or $^1/_2$ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope). **Exceptions:**

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required *means of egress*.
   1.2. The door is not part of an *accessible route* as required by Chapter 11 of the International Building Code.
   1.3. The door is not part of an accessible unit, Type A unit or Type B unit.
2. In *Type B units*, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 43/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 41/2 inches (114 mm) above the exterior deck, patio or balcony for other doors or allowed at a height necessary to comply with the water resistance requirements of Section 1709.5 of the *International Building Code*, whichever is greater..

Reason: This proposal is intended to provide needed clarity in Section 1010.1.4 Exception 5 and Section 1010.1.6 Exception 2 for decks on Type B units, as it is confusing as currently written. The revised language simply clarifies that a higher door threshold may be allowed as required to meet the water testing requirements found in Section 1709.5 of the IBC.

This change is similar to the clarification made in the current Florida Building Code.

Bibliography: Section 1010.1.6 of the 2023 Florida Building Code, Building, Eighth Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of allowances required for step downs and thresholds at decks when it comes to door thresholds and water testing requirements.

E49-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. It is not clear on what the maximum height would be under Section 1709.5. How would this be evaluated, inspected or reviewed? This could be a conflict with ICC A117.1 and Fair Housing requirements. Hurricane and wind storm requirements are not applicable for all areas of the country like it is in Florida. (Vote: 14-0)

E49-24

Individual Consideration Agenda

Comment 1:

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com) requests As Submitted

Reason: Section 1709.5 of the IBC provides for water testing requirements, requiring the design pressure rating of exterior windows and door assemblies (including sliding glass doors) to comply with either the AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) or the ASTM E330 standard. At the same time, Sections 1010.1.4 and 1010.1.6 of both the IBC and IFC provide for a maximum 4 inch threshold at doorways. Based on both these existing code provisions, this proposal is first and foremost intended to simply better coordinate the provisions. Second, it would allow for a threshold over 4 inches only if the water testing requirements of Section 1709.5 call for it, which could possibly occur in a unique building design.

It was brought up at the Committee Action Hearings in Orlando that making this clarification could conflict with the Americans with Disability Act (ADA), Fair Housing Act (FHA) and ICC A117.1 requirements. The code provisions being coordinated address Type B dwelling units. Whereas the ADA Standard for Accessible Design addresses accessible units and applies to public accommodations. The Type B units are coordinated with the FHA Accessibility Guidelines.

The 4 inch threshold found in the IBC and IFC comes from the FHA, which did not consider the need for more than 4 inches to address water resistance. The United States Department of Housing and Urban Development (HUD) came up with the 4 inches in the late 1980s, prior to the weather changes that have occurred over the last few decades. The strength of storms and wind driven rain have not only increased but have also become an issue for states that have not previously been in the path of these types of weather systems. This is not just a concern in hurricane prone states such as Florida, as storms increasingly go farther into the northeast.

These weather changes have resulted in the need to design products for higher rain and winds than what was done decades ago, and the current provisions in the IBC provide for those water testing requirements. In most cases, the threshold would never go over 4 inches, but in rare cases where it might be necessary, it is imperative the property be properly protected from water damage. Worst case scenario would be 7 3/4 inches below the top of the threshold, as allowed for in Section R318.3.1 of the IRC. The FHA Design and Construction Requirements adopts the IBC as a safe harbor under the FHA. If this proposal were to be adopted it would allow ICC staff to further

discuss with HUD the technical justification for why, in limited applications, the allowance for greater than a 4 inch threshold may sometimes be needed to protect the owners and residents from possible water damage.

Lastly, we recognize that the ICC A117.1 addresses all four levels of accessibility, including Type B units. However, it is our understanding that anytime there is a conflict with a standard and the building code, the code requirements rule. In the rare instance where an over 4 inch threshold may be necessary, the IBC requirements would override the ICC A117.1 requirement found in section 1104.4.2. Further, this conflict could also be addressed in the A117.1, as it is currently being updated.

In summary, this proposal is intended to provide needed clarity and ensure better coordination between two existing I-code requirements. The revised language simply clarifies that if the water testing requirements of Section 1709.5 find that in some conditions the water column may go beyond the 4 inches, in that limited circumstance a higher door threshold may be allowed.

Bibliography: IBC, Section 1709.5

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 213

E50-24

IBC: 1010.2.1, 1010.2.4; IFC: [BE] 1010.2.1, [BE] 1010.2.4

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. *Manual bolts* are not permitted. **Exceptions:**

1. Places of detention or restraint in Group I-3 occupancies.
2. Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint in Group I-3 occupancies.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.1 Unlatching. The unlatching of any door orleaf for egress shall require not more than one motion ina single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted. **Exceptions:**

1. Places of detention or restraint <u>in Group I-3 occupancies</u>.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint <u>in Group I-3 occupancies</u>.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:

   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

   3.2. The locking device is readily distinguishable as locked.

   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED." The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.

4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.

7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.

8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.

   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: The revisions of this proposal are intended to be editorial and to better communicate the intent of the code.
Our understanding is Exception 1 is intended to apply to Occupancy Group I-3, where security measures are not under the occupants' control.
In Occupancy Group I-3, the unlatching of a door would be expected to require more than on motion.
These are the only locations in the IBC and IFC where the phrase "detention or restraint" is used.
The specific needs for Groups I-1 and I-2 for health care clinical needs of care recipients are addressed in 1010.2.4 Item 2 (locks and latches), 1010.2.13.1 Item 6 exception (delayed egress locking systems), and 1010.2.14 Item 8 exception 1 (controlled egress locking systems).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Should not increase or decrease the cost of construction.
Code change proposal is editorial clarification of the intent of the code for places of detention and restraint.

E50-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Places of detention or restraint are needed in many other occupancies other than just Group I-3. This includes police and courthouses with fewer than 6 occupants in the jail. Several other areas were identified in the testimony that should be allowed to use this section appropriately. This change does not address the issue of the schools misinterpreting this section for classrooms. (Vote: 14-0)

E50-24

Individual Consideration Agenda

Comment 1:

IBC: 1010.2.1, 1010.2.4; IFC: [BE] 1010.2.1, [BE] 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Revise as follows:

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. *Manual bolts* are not permitted. **Exceptions:**

1. Places ~~of~~ designed and designated for occupant detention, ~~or~~ restraint , or containment ~~in Group I-3 occupancies~~.
2. Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places ~~of~~ designed and designated for occupant detention, ~~or~~ restraint , or containment ~~in Group I-3 occupancies~~.

2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
    3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
    3.2. The locking device is readily distinguishable as locked.
    3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
    3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.1 Unlatching. The unlatching of any door orleaf for egress shall require not more than one motion ina single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted. **Exceptions:**

1. Places ~~of~~ designed and designated for occupant detention, ~~or~~ restraint , or containment ~~in Group I-3 occupancies~~.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places ~~of~~ designed and designated for occupant detention, ~~or~~ restraint , or containment ~~in Group I-3 occupancies~~.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.

8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.

   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED.” The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: During CAH #1, there was significant testimony in opposition to the original proposal. The revisions proposed here are intended to address the concerns raised during CAH #1, and to address the issue of schools misinterpreting this exception regarding classrooms.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Code change proposal is editorial clarification of the intent of the code.

Comment (CAH2)# 657

E53-24

IBC: [BE] 403.5.3, [BE] 403.5.3.1, 1010.2.4, 1010.2.6; IFC: [BE] 1010.2.4, [BE] 1010.2.6

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

[BE] 403.5.3 Stairway door operation. *Stairway* doors ~~other than the exit discharge doors~~ shall be permitted to be locked to prevent passage from the *stairway* ~~side~~ into the building. *Stairway* doors that are locked to prevent passage from the *stairway* ~~side~~ into the building shall be capable of being unlocked without unlatching where any of the following conditions occur:

1. Individually or simultaneously upon a signal from the *fire command center*.
2. Simultaneously upon activation of a *fire alarm signal* in an area served by the *stairway*.
3. Upon failure of the power supply to the lock or the locking system.

[BE] 403.5.3.1 Stairway communication system. A telephone or other two-way communications system connected to an *approved constantly attended station* shall be provided at not less than every fifth floor in each *stairway* where the ~~doors to the~~ *stairway* doors are locked to prevent passage from the stairway into the building. Systems shall be *listed* in accordance with UL 2525 and installed in accordance with NFPA 72.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices ~~from the~~ which, when locked, prevent egress ~~side~~ provided that:
   3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

1010.2.6 Stairway doors~~~~ operation. ~~Interior *stairway*~~ *Stairway* doors in the *means of egress* ~~doors~~ shall be openable from both sides without the use of a key or special knowledge or effort. **Exceptions:**

1. *Stairway* discharge doors shall be openable from the egress side and shall ~~only be locked from the opposite side~~ be permitted to be locked to prevent passage into the stairway through the stairway discharge door.
2. ~~This section shall not apply to~~ *Stairway* doors arranged in accordance with Section 403.5.3 shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* ~~exit~~ doors shall not be locked ~~from the side opposite the egress side,~~ to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked ~~simultaneously~~ without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the *building*.
   3.2. Shall unlock simultaneously upon activation of a *fire alarm signal* when a fire alarm system is present in an area served by the stairway.
   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* ~~*exit*~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* ~~exit~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices ~~from the~~ which, when locked, prevent egress ~~side~~ provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED." The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.
4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:
   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.
   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

[BE] 1010.2.6 Stairway doors operation. ~~Interior *stairway*~~ *Stairway* doors in the *means of egress* ~~doors~~ shall be openable from both sides without the use of a key or special knowledge or effort. **Exceptions:**

1. *Stairway* discharge doors shall be openable from the egress side and shall ~~only be locked from the opposite side~~ be permitted to be locked to prevent passage into the stairway through the stairway discharge door.
2. ~~This section shall not apply to~~ *Stairway* doors arranged in accordance with Section 403.5.3 of the International Building Code shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* ~~exit~~ doors shall not be locked ~~from the side opposite the egress side,~~ to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked ~~simultaneously~~ without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the building.
   3.2. Shall unlock simultaneously upon activation of a fire alarm signal when a *fire alarm system* is present in an area served by the stairway.
   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* ~~*exit*~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* ~~exit~~ doors shall be openable from the egress side and shall only be locked ~~from the opposite side~~ to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit stairway where permitted in Section 1006.3.4.

Reason: Reviewing these sections of the IBC with a critical eye identifies several opportunities for editorial improvements.

In several sections there's language that permits stairway doors, where they comply with specified conditions, to be locked preventing passage from the stairway into the building or structure. But, the language used in the code is less clear than the language used in the 1st sentence of this paragraph of this reason statement. Several edits reflect the language of the 1st sentence of this paragraph.

Section 403.5.3 is all about provisions permitting locking of stairway doors in high-rise buildings limiting passage from the stairway into the building. In these provisions, there's not a need to address stairway exit discharge doors as stairway exit discharge doors are addressed in 1010.2.6 Exception 1. Section 403.5.3 is edited appropriately.

In sections 403.5.2 and 1010.2.6, the terms "stairway doors" and "stairway exit doors" are used to describe the same doors. It appears that "stairway doors" may be the better term to use when the code is addressing doors to / from stairways where the doors are in the means of egress (if the stairway doors are not in the means of egress, the code provisions most likely would not apply). Also, these provisions regarding stairway doors should be applicable to doors in interior exit stairways and to doors in exterior exit stairways. Edits are made in 403.5.2 and 1010.2.6.

The language of Exception 1 and 2 to Section 1010.2.6, as currently in the IBC, essentially exempt stairway discharge doors (Exception 1) and stairway doors complying with 403.5.3 (Exception 2) from the requirements in 1010.2.6 to be openable without the use of a key, special knowledge, or effort. That's not the intent of the code. These two exceptions are edited to more accurately describe the intent and scope of the exceptions.

In Exception 3 of Section 1010.2.6, the word "simultaneously" is redundant with the requirements in Items 3.1 and 3.2, and not appropriate if applied to Item 3.3. Thus "simultaneously" is deleted in Item 3 of 1010.2.6.

Exceptions 4 and 5 of Section 1010.2.6 are editorially revised to more clearly describe the intent of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal is not expected to increase or decrease the cost of construction.

The revisions are intended to be editorial improvements to the existing requirements of the code for stairways where the door can be locked.

E53-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The concept is good, but there appears to be a conflict with the change in Section 403.5.3.1 with the exit discharge section in Section 1028. The proposed text could allow for the door at the stairway door discharging into the lobby to be locked. (Vote: 14-0)

E53-24

Individual Consideration Agenda

Comment 1:

IBC: [BE] 403.5.3, 1010.2.6; IFC: [BE] 1010.2.6

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Revise as follows:

[BE] 403.5.3 Stairway door operation. *Stairway* doors, other than exit discharge doors, shall be permitted to be locked to prevent passage from the *stairway* into the building. *Stairway* doors that are locked to prevent passage from the *stairway* into the building shall be capable of being unlocked without unlatching where any of the following conditions occur:

1. Individually or simultaneously upon a signal from the *fire command center*.
2. Simultaneously upon activation of a *fire alarm signal* in an area served by the *stairway*.
3. Upon failure of the power supply to the lock or the locking system.

1010.2.6 Stairway door operation. *Stairway* doors in the *means of egress* shall be openable from both sides without the use of a key or special knowledge or effort. **Exceptions:**

1. *Stairway* discharge doors shall be openable from the egress side and shall be permitted to be locked to prevent passage into the stairway through the stairway discharge door.

2. *Stairway* doors arranged in accordance with Section 403.5.3, other than exit discharge doors, shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* doors shall not be locked to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the *building*.
   3.2. Shall unlock simultaneously upon activation of a *fire alarm signal* when a fire alarm system is present in an area served by the stairway.
   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* doors shall be openable from the egress side and shall only be locked to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* doors shall be openable from the egress side and shall only be locked to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.6 Stairway door operation. *Stairway* doors in the *means of egress* shall be openable from both sides without the use of a key or special knowledge or effort. **Exceptions:**

1. *Stairway* discharge doors shall be openable from the egress side and shall be permitted to be locked to prevent passage into the stairway through the stairway discharge door.
2. *Stairway* doors arranged in accordance with Section 403.5.3 of the International Building Code, other than exit discharge doors, shall be permitted to be locked to prevent passage from the stairway into the building.
3. *Stairway* doors shall not be locked to prevent passage from the stairway into the building unless they are openable from the egress side and capable of being unlocked without unlatching by any of the following methods:
   3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the *fire command center*, where present, or a signal by emergency personnel from a single location inside the main entrance to the building.
   3.2. Shall unlock simultaneously upon activation of a fire alarm signal when a *fire alarm system* is present in an area served by the stairway.
   3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. *Stairway* doors shall be openable from the egress side and shall only be locked to prevent passage from the stairway into the building in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* doors shall be openable from the egress side and shall only be locked to prevent passage from the stairway into the building in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit stairway where permitted in Section 1006.3.4.

Reason: The proposal, as submitted, inadvertently affected stairway exit discharge doors, as addressed by the provisions in Section 1028. This comment replaces language deleted in 403.5.3 (with minor edits), and inserts similar language in Exception 3 of 1010.2.6 for consistency with 403.5.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The revisions are intended to be editorial improvements to the existing requirements of the code.

Comment (CAH2)# 670

E54-24

IBC: 1010.2.4; IFC: [BE] 1010.2.4

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.
5. ~~Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or *sleeping units* of Group R occupancies and~~ Doors complying with any of the following are permitted to be equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.
   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies.
   5.3 Doors from individual sleeping rooms of *dwelling units* of Group R-2 occupancies serving as college or university residence halls.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.

8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:

   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

   3.2. The locking device is readily distinguishable as locked.

   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.

4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

5. ~~Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual *dwelling* or sleeping units of Group R occupancies and~~ Doors complying with any of the following are permitted to be equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.

   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies.

   5.3 Doors from individual sleeping rooms of *dwelling units* of Group R-2 occupancies serving as college or university residence halls.

6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.

   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED.” The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: This code proposal is about permitting locking of doors to individual sleeping rooms on Group R-2 occupancies similar to what’s permitted regarding locking of doors of hotel rooms (i.e. *sleeping units*) and college / university *dormitory* rooms (i.e. *sleeping units*).

Some college and university *dormitories* and residence halls are designed and constructed with suite-style layouts. The residence halls at Upstate University of South Carolina are one example: www.uscupstate.edu/campus-life/housing-and-dining/housing-floor-plans/.

Another example is Clarkson College residence hall: www.clarksoncollege.edu/student-life/residence-life/floor-plan-layout/index. But, do note the layout of the Clarkson College residence hall suites include permanent provisions for living, sleeping, eating, cooking, and sanitation, which means these suites would be considered *dwelling units,* per the IBC definition of *dwelling units*, and the buildings would be R-2 apartment houses. Thus, these suites would not be *congregate living facilities* (because *congregate living facilities* have *sleeping units*, but not *dwelling units*, per the IBC definition of *congregate living facilities*), and additionally, buildings containing these suites would not be a *dormitories* (because *dormitories* are a subset of *congregate living facilities*, per IBC Section 310.3).

The IBC currently permits dead bolts on the door into residence hall suites in the same manner as doors into *dwelling units* – see IBC Section 1010.2.4 Item 5. Considering the occupants of these residence hall suites are unlikely to be of the same family group (see the IBC definition of *dormitory*), there's a desire by the occupants to be able to enhance the security of their individual sleeping rooms. But, the IBC does not permit dead bolts on doors into each of the sleeping rooms of these residence hall suites.

This proposal was initially conceived as applicable only to Group R-2 *dormitories*; but perhaps the proposed revisions should be applicable to (permitted for) the individual sleeping rooms of all Group R-2 and Group R-3 *congregate living facilities* (as proposed here). *Congregate living facilities* include *boarding houses*, convents, *dormitories*, fraternities and sororities, and monasteries. In all of these uses, the occupants of the sleeping rooms would be primarily adults, are unlikely to be of the same family group, and the person that locks the door for security would be able to quickly unlock the door for egress.

Item 5.1 is moved from the Item 5 and editorially revised.

Item 5.2 applies to the individual sleeping rooms within the *sleeping units* of nontransient *congregate living facilities* of Group R-2, and applies to the sleeping units of nontransient and *transient congregate living facilities* of Group R-3.

Item 5.3 applies to the individual sleeping rooms of *dwelling units* in college and university residence halls.

2024 IBC Definitions (for information only):

[BG] BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

[BG] CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom or kitchen facilities, or both.

[BG] DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

[A] DWELLING. A building that contains one or two dwelling units used, intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

[A] DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

[A] SLEEPING UNIT. A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost changes.
This proposal permits, but does not require, the use of locking devices in these Group R applications.

E54-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: You could do a single action lock set on the bedroom to get the security you needed. There is a concern if there could be one of these on the bedroom and a second set on the unit door - there should not be two in a row. (Vote: 12-2)

E54-24

Individual Consideration Agenda

Comment 1:

IBC: 1010.2.1, 1010.2.4; IFC: [BE] 1010.2.1, [BE] 1010.2.4

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Revise as follows:

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. *Manual bolts* are not permitted. **Exceptions:**

1. Places of detention or restraint.
2. Doors with *manual bolts*, *automatic flush bolts* and *constant latching bolts* as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units*, ~~and~~ *sleeping units*, and sleeping rooms of Group R occupancies as permitted by Section 1010.2.4, Item 5.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of *persons* receiving care require containment or where *persons* receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In *buildings* in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the *building*, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   3.4. The use of the key-operated locking device is revocable by the *building official* for due cause.
4. *Manual bolts*, automatic flush bolts and *constant latching bolts* on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, *panic hardware*, or similar operating hardware.

5. Doors complying with any of the following are permitted to be equipped with a night latch, *dead bolt* or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.

   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies provided the doors from the *sleeping units* require not more than one motion for egress.

   5.3 Doors from individual sleeping rooms ~~of~~ within *dwelling units* of Group R-2 occupancies serving as college or university ~~residence halls~~ student housing provided the doors from the *dwelling units* require not more than one motion for egress.

6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the *building* from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the *building* for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.

   8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling* or *sleeping units*.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

2024 International Fire Code

Revise as follows:

[BE] 1010.2.1 Unlatching. The unlatching of any door orleaf for egress shall require not more than one motion ina single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted. **Exceptions:**

1. Places of detention or restraint.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual *dwelling units*, ~~and~~ *sleeping units*, and sleeping rooms of Group R occupancies as permitted by Section 1010.2.4, Item 5.

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.

2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. In buildings in occupancy Group A having an *occupant load* of 300 or less, Groups B, F, M and S, and in *places of religious worship*, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:

   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

   3.2. The locking device is readily distinguishable as locked.

   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED." The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

   3.4. The use of the key-operated locking device is revocable by the *fire code official* for due cause.

4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

5. Doors complying with any of the following are permitted to be equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

   5.1. Doors from individual Group R *dwelling* or *sleeping units* where a single *exit* complies with Section 1006.2.1 or 1006.3.4.

   5.2 Doors from individual sleeping rooms within *sleeping units* of *congregate living facilities* of Group R-2 and Group R-3 occupancies provided the doors from the *sleeping units* require not more than one motion for egress.

   5.3 Doors from individual sleeping rooms ~~of~~ within *dwelling units* of Group R-2 occupancies serving as college or university ~~residence halls~~ student housing provided the doors from the *dwelling units* require not more than one motion for egress.

6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed* fire door test procedures.

7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.

8. Other than *egress courts*, where occupants must egress from an exterior space through the building for *means of egress*, *exit access* doors shall be permitted to be equipped with an *approved* locking device where installed and operated in accordance with all of the following:

   8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the *exit access doorways*.

   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required *exit access* door on the exterior side.

   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.

   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each *exit access* door to determine if there are occupants using the outdoor area.

   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required *exit access* door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.

   8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.

9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual *dwelling*or *sleeping units*.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

Reason: The modifications are intended to address committee comments.

The revisions in 5.2 and 5.3 address the concern the original proposal would permit up to two doors in the means of egress with where each door would be permitted to have locking systems with two releasing motions for egress.

Also, Item 5.3 was revised to “student housing” to be inclusive of student housing in addition to residence halls (i.e. dormitories).

And, the revisions proposed in Exception 3 of 1010.2.1 are to synchronize this exception with the revisions proposed in Item 5 of 1010.2.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal permits, but does not require, the use of locking devices in these applications

Comment (CAH2)# 673

E59-24

IBC: 1010.2.8.2, 1010.2.8.2.1 (New); IFC: [BE] 1010.2.8.2, 1010.2.8.2.1 (New)

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Delete and substitute as follows:

~~**1010.2.8.2 Rooms with electrical equipment.** Exit or exit access doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular *data centers* shall be equipped with *panic hardware* or *fire exit hardware*. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the exit or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.~~

1010.2.8.2 Rooms with electrical equipment. Where an electrical equipment room, enclosure, or vault meets one or more of the following criteria, exit doors or exit access doors shall comply with Section 1010.2.8.2.1.

1. Room, enclosure, or vault for electrical equipment of 1000 volts, nominal, or less and rated 800 amperes or more that contain overcurrent devices, switching devices, or control devices and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
2. Vault for electrical equipment of over 1000 volts, nominal.
3. Room or enclosure for electrical equipment of over 1000 volts, nominal, and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
4. Transformer vault.
5. Room, enclosure, or vault for batteries or energy storage systems having a capacity greater than 1 kWh (3.6MJ).
6. Modular data center.

Add new text as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

2024 International Fire Code

Delete and substitute as follows:

~~**[BE] 1010.2.8.2 Rooms with electrical equipment .** *Exit* or *exit access* doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular *data centers* shall be equipped with *panic hardware* or *fire exit hardware*. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the *exit* or *exit access* door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.~~

[BE] 1010.2.8.2 Rooms with electrical equipment . Where an electrical equipment room, enclosure, or vault meets one or more of the following criteria, exit doors or exit access doors shall comply with Section 1010.2.8.2.1.

1. Room, enclosure, or vault for electrical equipment of 1000 volts, nominal, or less and rated 800 amperes or more that contain overcurrent devices, switching devices, or control devices and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
2. Vault for electrical equipment of over 1000 volts, nominal.
3. Room or enclosure for electrical equipment of over 1000 volts, nominal, and where the exit door or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70.
4. Transformer vault.
5. Room, enclosure, or vault for batteries or energy storage systems having a capacity greater than 1 kWh (3.6MJ).
6. Modular data center.

Add new text as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

Reason: This proposal is intended to be editorial and to more closely mesh with the requirements in NFPA 70 National Electrical Code. The IBC, in Chapter 27, requires compliance with NFPA 70. The current text in Section 1010.2.8.2 closely follows requirements in NFPA 70 regarding panic hardware and fire exit hardware, but the revised text more closely follows the requirements in NFPA 70, making it easier to understand what's required to comply with NFPA 70.

The charging language of 1010.2.8.2 is primarily the existing language in 1010.2.8.2 with editing to more closely mesh with terms used in NFPA 70. For example, electrical enclosures of wire fence-like material surrounding electrical equipment may not be considered an electrical equipment room – hence the proposed revisions to electrical equipment room, enclosure, or vault.

The criteria in Items 1 through 6 are from current requirements in 1010.2.8.2 and augmented by requirements in these sections of NFPA 70:

1. 110.26(C)(3) – electrical equipment rooms, enclosures, or vaults for 1000 volts or less
2. 110.31(A)(4) – electrical equipment vaults for more than 1000 volts
3. 110.33(A)(3) – electrical equipment rooms or enclosures for more than 1000 volts
4. 450.43(C) – transformer vaults
5. 480.1 and 480.10(E) – batteries and energy storage systems
6. 646.19 – modular data centers

Also, these six criteria were separated into items for easier correlation to NFPA 70 requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should result in no cost increase or decrease. The IBC requires compliance to the NEC, and the proposed revisions are intended for ease of understanding this aspect of NEC requirements.

E59-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This clarifies the requirements for electrical equipment rooms and coordinates with NFPA 70. (Vote 14-0)

E59-24

Individual Consideration Agenda

Comment 1:

IBC: 1010.2.8.2.1; IFC: 1010.2.8.2.1

Proponents: Micah Chappell, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (micah.chappell@seattle.gov); Ken Brouillette, Seattle Fire Department, Seattle Fire Department (ken.brouillette@seattle.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

Exception: Room, enclosure, or vault in Group R-3 or R-4 occupancies containing ESS that comply with Section 1207.11 of the *International Fire Code*.

2024 International Fire Code

Revise as follows:

1010.2.8.2.1 Electrical equipment room doors. Exit doors and exit access doors of such electrical room, enclosure, or vault shall swing in the direction of egress travel, and locks and latches on the doors shall be provided with panic hardware or fire exit hardware.

Exception: Room, enclosure, or vault in Group R-3 or R-4 occupancies containing ESS that comply with Section 1207.11.

Reason: We believe this added exception captures the intent of the original proposal and IFC Section 1207.11 that guides the installation of ESS in Group R-3 and R-4 occupancies. This exception would specify that panic hardware would not be required for exit doors or exit access doors from areas of Group R-3 and R-4 occupancies that contain energy storage systems that comply with the appropriate section of the IFC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification would clarify that panic hardware is not required for areas in R-3 and R-4 occupancies that have ESS installed in compliance with 1207.11 of the Fire Code.

Comment (CAH2)# 626

E60-24

IBC: 1010.2.12.1; IFC: [BE] 1010.2.12.1

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Revise as follows:

1010.2.12.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock, allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. ~~An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when~~ When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. ~~Once the delay has been deactivated, rearming~~ Rearming the delay electronics shall be by manual means only. **Exception:** Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress ~~door~~ locking system.
5. The egress path from any point shall not pass through more than one delayed egress locking system. **Exceptions:**
    1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
    2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
    3. The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware. **Exception:** Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.
   6.1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   6.2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   6.3. The sign shall comply with the visual character requirements in ICC A117.1.

7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034 .

2024 International Fire Code

Revise as follows:

[BE] 1010.2.12.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or automatic fire detection system, allowing immediate, free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock , allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. ~~An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when~~ When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. ~~Once the delay has been deactivated, rearming~~ Rearming the delay electronics shall be by manual means only. **Exception:** Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress ~~door~~ locking system.
5. The egress path from any point shall not pass through more than one delayed egress locking system. **Exceptions:**
   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
   3. The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware: **Exception:** Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.
   6.1. For doors that swing in the direction of egress, the sign shall read: "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   6.2. For doors that swing in the opposite direction of egress, the sign shall read: "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
   6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

Reason: In Item 4 and the exception to Item 4, the proposed revisions are primarily editorial. However, the revisions in the last sentence of Item 4 are technical, but are intended to clarify the intent of the code.

The last sentence of Item 4 is typically interpreted to require the delay electronics to be rearmed after the delay of the delayed egress locking system has completed. But, is that actually what this sentence requires? Copied here, for reference, is the existing last sentence of Item 4: "Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only."

Examining the current language, it has explicit requirements for rearming the locking system once the delay has completed, but, this sentence doesn't explicitly permit, or prohibit, rearming the delay electronics while the delay is underway. From a code perspective, if it's not prohibited, it's permitted. If this last sentence of Item 4 is interpreted that the delay electronics are not prohibited from being rearmed while the delay is underway, then it could be further interpreted the rearming could be executed by other than manual means only.

Rearming the delayed egress locking system, after the delay has deactivated, by manual means only communicates the intent that an authorized person, typically an employee or staff person, is required to physically be at the door to investigate what triggered the activation of the delayed egress locking system and to ensure that it is safe to re-set the delay.

With these thoughts in mind, the perspective from which the revisions to the last sentence of Item 4 are written: With a person at the delayed egress door to rearm the locking system manually, and to ensure it's safe to do so, there's little, if any, difference if the delayed egress locking system is rearmed while the delay is underway, or the locking system is rearmed after the delay has completed. In other words, there's little, if any, benefit to be gained if the locking system may be rearmed only after the delay has completed, compared to permitting rearming the locking system at any time after the delay has been initiated, assuming the rearming is required to be by manual means only (a person physically is at the door).

Moving to Item 5, the proposed new exception to Item 5 is intended to address situations in other than I-1 or I-2 where more than one delayed egress locking systems are desired. Consider the situation where a delayed locking system is needed on the stairway door on the 7th floor, and the building owner desires or needs a delayed egress locking system on the ground floor stairway discharge door. This new exception is intended to address these situations.

This proposed additional exception to Item 5 is intended to permit a 2nd delayed egress locking system where the delay of the 2nd system is initiated simultaneously with the delay of the 1st system. The effect is there is no delay at the 2nd delayed egress door for the occupant that goes through the 1st delayed egress locked door.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal should not increase or decrease the cost of construction.

The proposed revisions in Section 1010.2.12.1, Item 4are intended to clarify the intent of the code.

The proposed new exception in Section 1010.2.12.1, Item 5 is an optional application of a second delayed egress locking system. Delayed egress locking systems are not required by the code.

E60-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. Item 4 is a good clarification, however there was concerns about Exception 3 in Item 5. Where there are two doors in a series with delayed egress locks, should there be syncing of the doors; or is this all doors that could be reached? Exception 3 in item 5 is too difficult to program and test and should be addressed through alternative means on a case by case basis. (Vote: 11-2)

E60-24

Individual Consideration Agenda

Comment 1:

IBC: 1010.2.12.1; IFC: [BE] 1010.2.12.1

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Revise as follows:

1010.2.12.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock, allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Rearming the delay electronics shall be by manual means only. **Exception:** Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress locking system.

5. The egress path from any point shall not pass through more than one delayed egress locking system. **Exceptions:**
    1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
    2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the *building* shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
    3. ~~The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.~~

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware. **Exception:** Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.
    6.1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
    6.2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
    6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be *listed* in accordance with either UL 294 or UL 1034 .

2024 International Fire Code

Revise as follows:

[BE] 1010.2.12.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system* or automatic fire detection system, allowing immediate, free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock , allowing immediate free egress.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the *fire command center* and other *approved* locations.
4. When a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds, an irreversible process shall be initiated that allows such egress in not more than 15 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Rearming the delay electronics shall be by manual means only. **Exception:** Where *approved*, a delay of not more than 30 seconds is permitted on a door with a delayed egress locking system.

5. The egress path from any point shall not pass through more than one delayed egress locking system. **Exceptions:**

    1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
    2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
    3. ~~The egress path from any point in the building shall be permitted to pass a second delayed egress locking systems where the irreversible process of the second delayed egress locking system is initiated concurrently with the irreversible process required by Item 4 of the first delayed egress locking system.~~

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware: **Exception:** Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.
    6.1. For doors that swing in the direction of egress, the sign shall read: "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
    6.2. For doors that swing in the opposite direction of egress, the sign shall read: "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."
    6.3. The sign shall comply with the visual character requirements in ICC A117.1.
7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

Reason: The committee was concerned with proposed new Exception 3 of Item 5, and appeared to be supportive of the revisions of Item 4.

This comment removes (deletes) the proposed text of concern.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed revisions in Section 1010.2.12.1, Item 4 are intended to clarify the intent of the code.

Comment (CAH2)# 681

E63-24

IBC: 1010.3.5 (New); IFC: 1010.3.5 (New)

Proposed Change as Submitted

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com)

2024 International Building Code

Add new text as follows:

1010.3.5 Airport Terminal Exit Lanes. Airport terminal egress from the secured airside area to the nonsecured landside area shall be permitted to be through exit lane breach control systems which comply with all of the following:

1. The exit lane breach control system is installed in accordance with the manufacturer's instructions.
2. The exit lane breach control system is approved by the building official.
3. The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).
4. The operation of the exit lane breach control system is included in the TSA-required airport security program.

2024 International Fire Code

Add new text as follows:

1010.3.5 Airport Terminal Exit Lanes. Airport terminal egress from the secured airside area to the nonsecured landside area shall be permitted to be through exit lane breach control systems which comply with all of the following:

1. The exit lane breach control system is installed in accordance with the manufacturer's instructions.
2. The exit lane breach control system is approved by the building official.
3. The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).
4. The operation of the exit lane breach control system is included in the TSA-required airport security program.

Reason: Airport exit lane breach control systems facilitate passenger movement in the terminals from secure areas to non-secure areas. Airports are installing these automated systems to improve security and remove much of the human element where arriving passengers move from the secure area of the airport to the unsecured area. The IBC is currently silent regarding requirements for airport exit lane breach control systems.

Airport exit lane breach control systems are relatively sophisticated, and not all the details as to how they work are made public (for good reasons). These systems incorporate power-operated doors, sensors, cameras, alarms, and electronic and human monitoring, all designed to detect unauthorized intruders and unauthorized objects.

Portland, Oregon airport exit lane breach control system.

This four-minute video of one manufacturer's exit lane breach control systems provides a good illustration of the functions: https://www.youtube.com/watch?v=PxMQB4ykOeo

Additional information about exit lane breach control systems is available:

https://www.assaabloyentrance.com/global/en/solutions/products/security-entrance-control/exit-lanes
https://www.hortondoors.com/additional-products/exit-breach-control/secure-exit-lane/

The TSA requires the airport's security program to include operation procedures for exit lane breach control systems.

The TSA does not "approve" the method for controlling exit lanes they no longer staff in airports—they only accept or do not accept the solution. However, the TSA can levy penalties or open a Letter of Investigation for breaches and any incidents that occur. As a result, it is in the airport's best interest to work closely with local TSA during the design and procurement stages and to update the airport security plan as appropriate.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not increase or decrease the cost of construction.
Airports are not required by this proposal to install exit lane breach control systems. This proposal provides guidance and requirements for airport exit lane breach control systems, should they be installed.

E63-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: These types of doors should be included in the code, but the requirements need further work. Items 3 and 4 could not be verified by the code official since they would not have access to airport security items. Several of the new terms used in the proposal should be defined. Should there be a minimum depth between doors? Item 2 needs to provide guidance for the code official for

access controls, connection to alarm systems, limitations for the number of occupants, etc. similar to the other special locking arrangements. (Vote: 12-2)

E63-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202 (New), 1010.3.5; IFC: SECTION 202 (New), 1010.3.5

Proponents: John Woestman, Kellen Company, Builders Hardware Manufacturers Association (BHMA) (jwoestman@kellencompany.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Add new definition as follows:

EXIT LANE BREACH CONTROL SYSTEM. In airports, a system of doors which facilitates occupant movement in the intended direction, and provides access control to prevent wrong way movement of unauthorized persons and objects.

SECURED AIRSIDE AREA. In airports, the spaces of airport terminal buildings where passengers and personnel are authorized after having passed security screening. Passengers board airplanes from these spaces, and disembark airplanes into these spaces.

NON-SECURED LANDSIDE AREA . In airports, the spaces of airport terminal buildings open to the public.

Revise as follows:

1010.3.5 Airport terminal exit lanes. Airport terminal ~~egress~~ occupant movement from the *secured airside area* to the *non-secured landside area* shall be permitted to be through *exit lane breach control systems* which comply with ~~all of~~ the following:

1. ~~The exit~~ *Exit lane breach control* ~~*system* is~~ *systems* shall be installed in accordance with the manufacturer's instructions.
2. ~~The exit~~ *Exit lane breach control* ~~*system* is approved~~ *systems* shall be subject to approval by the building official.
3. ~~The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).~~
4. ~~The operation of the exit lane breach control system is included in the TSA-required airport security program.~~

2024 International Fire Code

Add new definition as follows:

EXIT LANE BREACH CONTROL SYSTEM. In airports, a system of doors which facilitates occupant movement in the intended direction, and provides access control to prevent wrong way movement of unauthorized persons and objects.

SECURED AIRSIDE AREA. In airports, the spaces of airport terminal buildings where passengers and personnel are authorized after having passed security screening. Passengers board airplanes from these spaces, and disembark airplanes into these spaces.

NON-SECURED LANDSIDE AREA. In airports, the spaces of airport terminal buildings open to the public.

Revise as follows:

1010.3.5 Airport terminal exit lanes. Airport terminal ~~egress~~ occupant movement from the *secured airside area* to the *non-secured landside area* shall be permitted to be through *exit lane breach control systems* which comply with ~~all of~~ the following:

1. ~~The exit~~ *Exit lane breach control* ~~*system* is~~ *systems* shall be installed in accordance with the manufacturer's instructions.
2. ~~The exit~~ *Exit lane breach control* ~~*system* is approved~~ *systems* shall be subject to approval by the building official.
3. ~~The exit lane breach control system is accepted by the U.S. Department of Homeland Security (DHS) Transportation Security Administration (TSA).~~
4. ~~The operation of the exit lane breach control system is included in the TSA-required airport security program.~~

Reason: The committee suggested provisions for these types of door systems should be in the code. In addition, the committee provided suggestions for revisions to the proposal.

Before discussing the proposed revisions to this proposal, a bit more information about these exit lane breach control systems:

Airport exit lane breach control systems facilitate occupant movement in airport terminals from secure areas (the airside areas) to non-secure areas (the landside areas). Typically, the doors in exit lane breach control systems operate just like automatic doors – sensors detect approaching people and open the door(s) for unimpeded travel through the door(s) by one or multiple people. The video in this news article shows these systems in action (at 40 sec): https://www.newschannel5.com/news/new-security-efforts-underway-at-bna-to-protect-travelers. Most important, the primary reason for exit lane breach control systems is air travel safety. These door systems are designed to stop unauthorized persons from traveling the wrong way, and are designed to thwart thrown objects and to detect abandoned objects.

Airports are installing these automated systems to improve security and remove much of the human element where arriving passengers move from the secure area of the airport to the unsecured area. The IBC is currently silent regarding requirements for airport exit lane breach control systems.

Airport exit lane breach control systems are relatively sophisticated, and not all the details as to how they work are made public (for good reasons). These systems incorporate power-operated doors, sensors, cameras, sophisticated electronic monitoring, alarms, and human monitoring, all designed to detect unauthorized intruders and unauthorized objects. Should a person attempt wrong way travel in a lane in the exit lane breach control system, the door(s) in that lane in front of the wrong way person typically close preventing further wrong way travel. Typically, exit lane breach control systems are installed with multiple lanes, and a violation in one lane does not affect the functionality of the other parallel lanes. Exit lane breach control systems are installed in a manner that prevents objects from being thrown over the top while also facilitating fire sprinkler coverage inside the lanes.

Portland, OR airport exit lane breach control systems.

Anchorage, AK airport exit lane breach control systems.

What was Items 3 & 4 are deleted per the committee reasons.
Three definitions are proposed – the committee suggested several of the new terms should be defined.
Regarding the suggestion to provide guidance for code officials for additional topics . . . in airports, exit lane breach control systems are typically installed near where TSA security screening is located. The TSA is responsible for screening essentially all persons desiring to move from the non-secure landside space of the airport to the secure airside space. Occupant flow in the other direction – from the secure space to the non-secure space – is typically routed either through a staffed exit lane (where the staff is responsible to monitor and prevent wrong way travel in the exit lane) or through an exit lane breach control system which facilitates travel in the exit direction while also preventing and blocking travel in the wrong way direction. Exit lanes, staffed or with exit lane breach control systems, are designed and sized to accommodate all occupant traffic moving from the secured space to the non-secured space of the airport terminal building. Exit lane breach control systems are typically in one of the means of egress and are complemented by numerous other means of egress from the secured space of the airport terminal. In the event of fire or smoke, the exit lane breach control system typically would need to function much as it would during non-emergency use: facilitating people movement in the intended direction while also preventing wrong way movement.

And, exit lane breach control systems in the means of egress would be required to comply with all applicable egress provisions. Similarly, exit lane breach control systems on an accessible route would be required to comply with applicable provisions for accessibility.
This four-minute video of one manufacturer's exit lane breach control systems provides a good illustration of the functions: https://www.youtube.com/watch?v=PxMQB4ykOeo

Additional information about exit lane breach control systems is available:

https://www.assaabloyentrance.com/global/en/solutions/products/security-entrance-control/exit-lanes
https://www.hortondoors.com/additional-products/exit-breach-control/secure-exit-lane/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Airports are not required by this proposal to install exit lane breach control systems. This proposal provides guidance and requirements for airport exit lane breach control systems, should they be installed.

Comment (CAH2)# 685

E65-24

IBC: 1010.5.1; IFC: [BE] 1010.5.1

Proposed Change as Submitted

Proponents: Daniel Nichols, MTA Construction and Development, MTA Construction and Development (dnichols@mnr.org)

2024 International Building Code

Revise as follows:

1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-*person occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by ~~an employee in the area~~ a trained person in an approved method.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than $16^{1}/_{2}$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

2024 International Fire Code

Revise as follows:

[BE] 1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by ~~an employee in the area~~ a trained person in an approved method.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than $16^{1}/_{2}$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

Reason: The use of turnstiles occurs in many locations such as transportation facilities, lobby control in access-limited buildings, and amusement locations. The current language states that turnstiles need to have a manual release by an "employee in the area", but provides no reasoning for the limitation to an employee, nor to a physical dimension of "in the area".

The proposal moves towards the need for trained personnel to be able to react and have that methodology approved by the AHJ. This could be as simple as a security desk having CCTV observation ability and a remote release for a control point at a building entrance out-of-view, to a multi-lane point of entry into an amusement park with a coordinated command center. Further, the proposal does not remove or inhibit the current use of the "employee in the area" for jurisdictions that already successfully utilize the section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides another option to provide manual release of turnstiles. Many turnstiles already free spin or operate in the direction of egress, so this would provide options due to changes in technology.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The committee felt that E64-24 was more comprehensive. The proposed language would be difficult to enforce. (Vote: 14-0)

E65-24

Individual Consideration Agenda

Comment 1:

IBC: 1010.5.1; IFC: [BE] 1010.5.1

Proponents: Daniel Nichols, MTA Construction and Development, MTA Construction and Development (dnichols@mnr.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Revise as follows:

1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-*person occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by a ~~n employee in the area~~ person that can monitor the location and is trained in accordance with Section 406 of the International Fire Code.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than $16^{1}/_{2}$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

2024 International Fire Code

Revise as follows:

[BE] 1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person *occupant load* where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by a~~n employee in the area~~ person that can monitor the location and is trained in accordance with Section 406.
2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.

4. Each device has not less than $16\frac{1}{2}$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

Reason: This comment is to further define the operator of the manual release. The current language of "employee in the area" does not provide any actual qualifications of the person, limits the person to an employee, and gives the term "area" which has no performance requirements. The proposal adds a direct link to the education required by the actual operator of the applicable fire safety, evacuation, and lockdown plans.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an operational change with no construction cost implications.

Comment (CAH2)# 439

E67-24

IBC: 1011.5.2; IFC: [BE] 1011.5.2

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

Revise as follows:

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads, ~~or~~ between the nosing of the ~~*stairway*~~ upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or Type A dwelling or *sleeping units* ; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7\,^{3}/_{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19.1 mm) but not more than $1\,^{1}/_{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 *facilities*, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.

2024 International Fire Code

[BE] 1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

[BE] 1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

Revise as follows:

[BE] 1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum.

The riser height shall be measured vertically between the *nosings* of adjacent treads, ~~or~~ between the nosing of the ~~*stairway*~~ upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or *Type A* dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^3/_4$ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.

Reason: This code change is centered on clarifying where a bottom riser's, height measurement, is to be taken in conjunction with the lower landing.

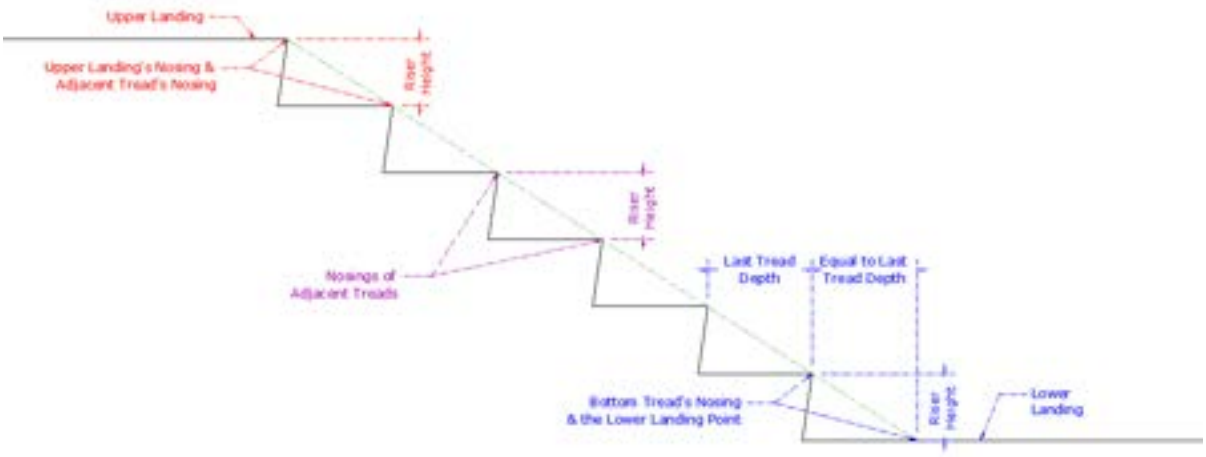
There are 3 distinct parts of a stair flight for when measuring riser heights.

1. The top landing's nosing, to the nosing of the first tread down, the adjacent tread.
2. The nosings of adjacent treads within the flight of stairs.
3. The bottom tread's nosing and the lower landing.

Currently the code is clear in that you are to measure from the upper landing's nosing to the adjacent lower tread's nosing, and to measure from the nosing of one tread to an adjacent tread within the flight, as they all have **nosings.** The confusion and or question comes in that the lower landing does not have a physical/traditional nosing point per say, as defined within the code, and as thus, many a times the bottom riser is measured directly at the bottom tread's riser and not at the same point in distance as every other riser within the flight of stairs, which are all measured to an **adjacent nosing**.

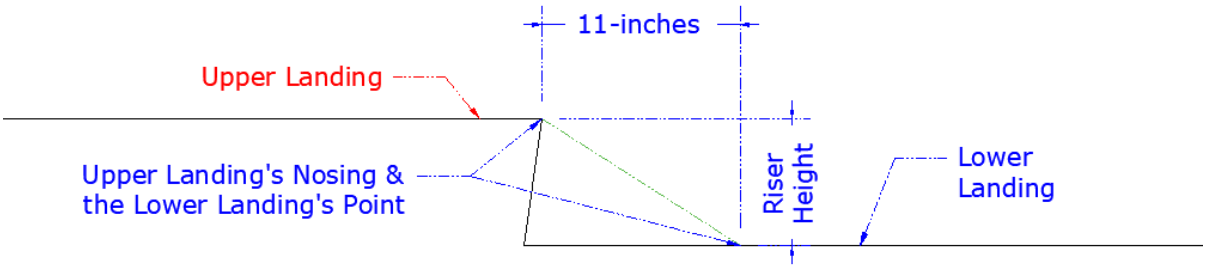
In Section 1014.7 Handrail extensions. The code requires that handrail extensions continue for one tread depth beyond the bottom tread's nosing, this is theorized to be for when descending or ascending the same area is used by the person on the stair flight. With this in our focus, this code change represents that the same theory and point justified and specified for the handrail extension, is to be used for the riser measurement on the lower landing, keeping in mind that this is the same measurement point used within the stair flight on all the other risers up to this point.

To help show a visual representation of the new text, sketch RC-01 included in this reason statement below shows the 3 distinct types of riser measurements within a flight of stairs, in conjunction with a superimposed nosing line as reference for a point of contact on the lower landing, proposed to being revised.



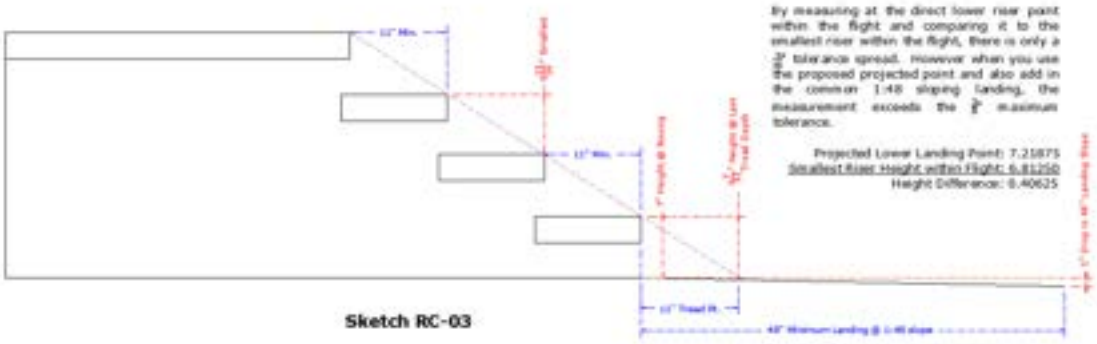
SKETCH RC-01

The second sketch RC-02 included in this reason statement is for the exception and explains the same point of measurement for when there is only one single riser between 2 landings and provides direction with the exception when there are no treads, by following the bottom tread requirement in a flight with the specified minimum tread depth of 11 inches for these specific single riser conditions.



SKETCH RC-02

Of note to keep in mind, If the smallest riser height within a flight is 6.8125", and the bottom riser height at the lower landing is 7", at the riser. And the lower landing slopes away at 1:48, 1/4" to the foot, then at the minimum 11" projected forward point you will be over the maximum 3/8" tolerance allowed per code, see sketch RC-03.



SKETCH RC-03

Bibliography:

- ICC Model 2024 IBC
  - Section 1011.7.1 Stairway walking surface.
  - Section 1014.7 Handrail extensions.
- 2010ADA

- Section 504.4 Tread surface.
- Section 505.10.
- Section 505.10.3

- ICC 2017 A117.1
  - Section 504.4 Tread surface.
  - Section 505.10.
  - Section 505.10.3

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

We believe that there are no cost increases or decrease with this code change, as it only further clarifies the measurement point of the required measurement for where the bottom riser height of a stair flight shall be taken.

E67-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal is overly complicated and confusing. (Vote: 9-5)

E67-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.5, 1011.5.1, 1011.5.2; IFC: [BE] 1011.5, [BE] 1011.5.1, [BE] 1011.5.2

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between ~~the~~ adjacent *nosings* ~~of adjacent treads~~ within the flight, ~~between the nosing of the upper landing and the adjacent lower tread,~~ and between the ~~nosing of the~~ bottom nosing ~~tread~~ and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or Type A dwelling or *sleeping units* ; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^3/_4$ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 *facilities*, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where ~~only~~ a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the ~~upper landing's~~ nosing.

2024 International Fire Code

[BE] 1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

[BE] 1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

[BE] 1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between ~~the~~ adjacent *nosings* ~~of adjacent treads~~ within the flight, ~~between the nosing of the upper landing and the adjacent lower tread,~~ and between the ~~nosing of the~~ bottom nosing ~~tread~~ and a projected point forward on the lower landing equal to the bottom tread's depth. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or *Type A* dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $^3/_4$ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. Where ~~only~~ a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the ~~upper landing's~~ nosing.

Reason: Please Review the original proposals reason statement in addition to these comments about the text modification.

- The model codes went from measuring riser heights at the risers to the now clarified point of the nosings.
  - With this productive change made by the SMA, there was one point over looked in that the lower landing never has a nosing, inline with the stair geometry.
  - As thus, there is no clarified point per code to measure the bottom nosing to the lower landing.
- This measurement issue has been tracked throughout the country by the NOMMA members reporting back to the volunteer committee that reviews and then submits code changes to clarify issues its membership sees in the field that are not on point and enforced uniformly across jurisdictions within a state, and from state to state.
- We understand that the original proposal was wording, as thus, the editing done within this proposal built on the advice of committee member comments at the CAH1 in Florida.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

We beleive that there are no cost increase with this code change, as it only further clarifies the measurement point of the required measurement for where the bottom riser height of a stair flight shall be taken.

Comment (CAH2)# 736

Comment 2:

IBC: 1011.5.2; IFC: [BE] 1011.5.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between ~~the *nosings* of~~ adjacent ~~treads~~ nosings, the height of a single riser between landings or the lowest riser of the flight shall be measured vertically from the nosing to a point one tread depth on to the landing. ~~between the nosing of the upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth.~~Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or Type A dwelling or *sleeping units* ; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7\frac{3}{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $\frac{3}{4}$ inch (19.1 mm) but not more than $1\frac{1}{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.

5. In Group I-3 *facilities*, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. ~~Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.~~

2024 International Fire Code

[BE] 1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between ~~the *nosings* of~~ adjacent ~~treads~~ nosings, the height of a single riser between landings or the lowest riser of the flight shall be measured vertically from the nosing to a point one tread depth on to the landing. ~~between the nosing of the upper landing and the adjacent lower tread, and between the nosing of the bottom tread and a projected point forward on the lower landing equal to the bottom tread's depth.~~ Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair. **Exceptions:**

1. *Spiral stairways* in accordance with Section 1011.10.
2. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies not required by Chapter 11 to be *Accessible* or *Type A* dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be $7\frac{3}{4}$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than $\frac{3}{4}$ inch (19.1 mm) but not more than $1\frac{1}{4}$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
4. See Section 503.1 of the International Existing Building Code for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. ~~Where only a single riser is located between 2 landings, the riser height shall be measured between the upper landing's nosing and a projected point on the lower landing 11 inches (280 mm) forward of the upper landing's nosing.~~

Reason: This comment provides clear and concise language that meets the intent of the original proposal and assures compliant use of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

We believe that there are no cost increases or decrease with this code change, as it only further clarifies the measurement point of the required measurement for where the bottom riser height of a stair flight shall be taken.

Comment (CAH2)# 216

E68-24

IBC: 1011.5.5.1, 1011.5.5.2; IFC: [BE] 1011.5.5.1, [BE] 1011.5.5.2

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.5.5.1 Nosing projection size. The nosings shall project not more than $1^{1}/_{4}$ inches (32 mm) ~~beyond~~ over the trailing edge of the tread below

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

1011.5.5.2 Nosing projection uniformity. Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size~~, including the projections of the *nosings* of the floor or landing at the top of a *flight*~~.

2024 International Fire Code

Revise as follows:

[BE] 1011.5.5.1 Nosing projection size. The nosings shall project not more than $1^{1}/_{4}$ inches (32 mm) ~~beyond~~ over the trailing edge of the tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size~~, including the projections of the *nosings* of the floor or landing at the top of a *flight*~~.

Reason: Nosing projection size.

Use of the preposition “over” is more accurate than “beyond”. Beyond is defined as indicating to the further side of. A tread’s nosing does not extend or project “to the further side of” the tread below but rather “over” just a small portion of the tread below. The term beyond as used here is inappropriate. Deleting beyond and adding “over the trailing edge” clarifies for enforcement the point on the tread below from which the nosing projection of the tread above can be measured.

Nosing projection uniformity.

The proposal further clarifies the requirement with more direct/concise sentence structure that will result in more consistent understanding and enforcement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The language substitutions and changes in syntax add no technical requirements that are material to construction methodology and will neither increase or decrease the cost of construction.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The intent of the language for the nosing projection measurements is an improvement, however, the revised text is confusing. (Vote: 8-6)

E68-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.5.5.1, 1011.5.5.2; IFC: [BE] 1011.5.5.1, [BE] 1011.5.5.2

Proponents: Ashley Goodin, Technical Services, Stairbuilders and Manufacturers Association (ashley.goodin@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.5.5.1 Nosing projection size. The nosings shall project not more than $1\frac{1}{4}$ inches (32 mm) ~~over the trailing edge of the tread below~~ . Nosing projection shall be measured horizontally between the vertical plane of the foremost projection of the nosing and the intersection of the riser and tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

1011.5.5.2 Nosing projection uniformity. Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size.

2024 International Fire Code

[BE] 1011.5.5.1 Nosing projection size. The nosings shall project not more than $1\frac{1}{4}$ inches (32 mm) ~~over the trailing edge of the tread below~~. Nosing projection shall be measured horizontally between the vertical plane of the foremost projection of the nosing and the intersection of the riser and tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections of treads within a flight of stairs and of the landing at the top of the flight shall be of uniform size.

Reason: This comment clarifies the points of measurement based on feedback received from the committee during the CAH1 hearing and the proponents intent. The text describing the measurement of the the nosing projection parallels that of the tread depth requirement that has been well understood and enforced for years...

From **1011.5.2 Riser height and tread depth.**

> ...tread depths shall be...*measured horizontally between the vertical planes of the foremost projection*... <*emphasis added*>

Your approval of this comment will clarify the code and assure consistent determination of the nosing projection size.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal does not affect labor and materials, only clarifies a point of measurement for code compliance.

Comment (CAH2)# 146

E69-24

IBC: 1011.6; IFC: [BE] 1011.6

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of ~~*stairways*~~ the flight served. ~~Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less.~~ Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

~~2~~ 1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.

~~3~~ 2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

~~1~~ 3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.

2024 International Fire Code

Revise as follows:

[BE] 1011.6 Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each ~~*stairway*~~ *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of ~~*stairways*~~ the flight served. ~~Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less.~~ Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

~~2~~ 1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.

~~3~~ 2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

~~1~~ 3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.

Reason: It is important to note here that by definition in the IBC a stairway includes the flights and landings. A landing may occur at the top or bottom of a flight or between flights of a stairway not only at the top and bottom of a stairway. Substituting *flight* for *stairway* offers the correct description using the terms as defined.

Stairway. One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

Flight. A continuous run of rectangular treads, winders or combination thereof from one landing to another.

A stairway may turn at any of these landing locations. The current language refers to the direction of travel but fails to provide a reference location or perspective. Width and depth reverse with ascent and descent on a 90 degree, or quarter space landing. Is the direction of travel to be considered an arc through the turn on the landing or the direction of travel across a landing adjoining two flights at a 180 degree, or half space landing. What is width and what is depth? If there are multiple flights adjoining the landing determining the direction of travel and the width or depth is confusing at best. By referencing the direction of the flight served and the change of the direction of the stairway the depth and width are more clearly understood.

The current text by the most grievous interpretation might imply that the landing may be just 48 inches in depth in situations not intended. We have corrected this anomaly by clarifying that the 48" minimum only applies to stairways that do not change direction a the landing.

The proposed language eliminates trying to distinguish width and depth axes that can reverse with ascent and descent more clearly describes the intent of the width and depth requirements.

Exception 1 has been moved to exception 3 without change because it is likely less common in terms of general use and application when compared to the other exceptions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes proposed serve to restructure and correct the technical requirements for landings to aid interpretation and enforcement without material change to the methods or costs of construction.

E69-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata for IBC and IFC
The following language was shown as struck out in the 3rd sentence of the proposal. However, this language is not current text. This language will be removed from the proposal.

"~~depth of landings shall be measured in the direction of travel of the flight served and shall be not less than~~"

Committee Action: **As Submitted**

Committee Reason: This proposal clarifies the requirements for measurement of the landings. The committee was concerned that this proposal removed "floor or" that was disapproved by the committee in E48-24. (Vote: 12-2)

E69-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.6; IFC: [BE] 1011.6

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.6 Stairway landings. There shall be a landing at the top and bottom of each *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the *flight* served , shall be not less than the width of the flight served. Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.
3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
4. Where a tread depth of less than 11 inches (279 mm) is permitted the landing depth shall be 36 inches (914 mm) minimum where there is no change in direction of the stairway at the landing.

2024 International Fire Code

[BE] 1011.6 Stairway landings. There shall be a landing at the top and bottom of each *flight* of stairs. The width of landings, measured perpendicularly to the direction of travel of the flight served , shall be not less than the width of the flight served. Where there is a change in direction of the stairway at the landing, the landing depth shall be not less than the smallest width of the flights served. Where there is no change in direction of the stairway at the landing, the landing depth shall be 48 inches (1219 mm) minimum. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exceptions:

Exceptions:

1. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
2. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.
3. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
4. Where a tread depth of less than 11 inches (279 mm) is permitted the landing depth shall be 36 inches (914 mm) minimum where there is no change in direction of the stairway at the landing.

Reason: Although this proposal was approved, the committee questioned an errata and implied that there was text struck out that was not part of the code. Staff has informed me that the errata in the original proposal, mentioned by the committee has been corrected as published here for comment.

It is important to point out that landing depth should best be understood as being on the same axis as tread depth. Landing width is on the same axis as the width of the stair or flight. That said it was pointed out at the hearing that an exception should be considered for stairs within residential applications and other locations where the tread depth and and resulting stride is shorter. The new exception 4 provides for the same 36 inch limit as is in the IRC and is recommended.Please approve as modified by this comment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The changes proposed serve to restructure and correct the technical requirements for landings to aid interpretation and enforcement without material change to the methods or costs of construction.

Comment (CAH2)# 253

E70-24

IBC: 1011.7.1 (New), 1012.7.1 (New); IFC: 1011.7.1 (New), 1012.7.1 (New)

Proposed Change as Submitted

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Add new text as follows:

1011.7.1 Stairway Supporting Construction. *Stairway* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6. **Exception:** *Stairway* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

1012.7.1 Ramp Supporting Construction. *Ramp* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6. **Exception:** *Ramp* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

2024 International Fire Code

Add new text as follows:

1011.7.1 Stairway Supporting Construction. *Stairway* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6. **Exception:** *Stairway* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

1012.7.1 Ramp Supporting Construction. *Ramp* supporting construction shall have a fire resistance rating equivalent to the rating of the enclosure or separation required by Sections 1023.2 and 1027.6. **Exception:** *Ramp* supporting construction located within the fire resistance rated enclosure or exterior to the building does not require a fire resistance rating.

Reason: NOTE: These two new sections are intended to be directly following the charging sections, 1011.7 and 1012.7, respectively. The following sections remain unchanged and should follow these new sections.

There is a requirement for stairway and ramp enclosures to be constructed with fire barriers in accordance with IBC Section 1023.2. This requires the supporting construction for the enclosure to be protected to afford the required fire resistance rating of the fire barrier supported in accordance with IBC Section 707.5.1.

Stair and ramp enclosures should be supported in accordance with the fire resistance rating of the enclosure to assist in the egress of occupants and response of first responders. However, this does not currently extend to the landings and stairway/ramp construction which may extend beyond the enclosure into the building. For example, a four-story exit enclosure in a Type II-B building would be provided with a 2-hour fire resistance rating and associated supporting construction. However, if the specific landing supports extend beyond the enclosure, the associated landing supports are not required to be protected. The intent is an exit enclosure to be provided with structural fire protection and reliability and it should extend to the elements which support occupants within that enclosure that are not protected by the enclosure.

The reasoning for locating the requirement in these sections is it would be applicable to stairway and ramp construction (both interior and exterior) that have supporting construction which extends into the building and may be unprotected.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

For a single 5-story stair utilizing this design strategy quotes were received for $15,000-$32,000 to provide fireproofing to these

supporting structural members. It should be reiterated that other structural design strategies are available which would not represent a cost increase for this scenario. The cost, if present, is immediate with no significant life-cycle cost anticipated.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is not considered a cost increase for all stair/ramp enclosures where stairway/ramp construction are located within the exit enclosure or in circumstances where the enclosure supporting construction is shared with the stairway/ramp. The cost impact for providing fire resistance to supporting construction of stairways/ramps that extend beyond the enclosure is dependent upon numerous factors including number/size of supporting members, method of fire protection and required fire resistance rating.

A case study was developed which may represent a cost increase as a portion of the cost impact statement. Conservatively a 5 story Type II-B (non-rated non-combustible steel building) which could be found in a Group R-2 sprinklered occupancy type building was considered. This would require a 2-hour fire rated separation for the stairway and associated supporting construction which exited the stair enclosure as identified in this proposal. The proposal team worked with a structural engineer on a structural design which would be utilized to support the stairway construction and provided this information to spray-applied fireproofing contractors for pricing.

Additional supporting cost information can be found at the FTP below:

https://files.coffmanftp.comUser name: ICC@coffmanftp.com

Password: G10G7Vw84rjq

E70-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal should be addressed in Section 1023 for the stairway enclosure, not the general stairway provisions. As written, it could be read to apply to exit access stairways. There should be a separate exception for an exterior wall. The exception needs to clarify if this is for stairways totally within the enclosure, or supporting elements that come through the enclosure walls. (Vote: 14-0)

E70-24

Individual Consideration Agenda

Comment 1:

IBC: 1023.2.1 (New); IFC: [BE] 1023.2.1 (New)

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Add new text as follows:

1023.2.1 Supporting construction. Structural elements that support interior exit stairways and ramps and that penetrate, or are installed within the membrane of a required fire resistance rated assembly shall be provided with a fire resistance rating not less than the enclosure.

2024 International Fire Code

Add new text as follows:

[BE] 1023.2.1 Supporting construction. Structural elements that support interior exit stairways and ramps and that penetrate, or are installed within the membrane of a required fire resistance rated assembly shall be provided with a fire resistance rating not less than the enclosure.

Reason: The previous proposed code change was located in 1011.7 and 1012.7 to address stairs and ramps (including exterior) that require a rating. However, after committee feedback this is being relocated to 1023.2.1 explicitly and reworded.
This comes into align with NFPA 101 Section 7.1.3.2.1(5):

"Structural elements, or portions thereof, that support exit components and either penetrate into a fire-resistance-rated assembly or are installed within a fire-resistance-rated wall assembly shall be protected, as a minimum, to the fire resistance rating required by 7.1.3.2.1(1) or 7.1.3.2.1(3).

Annex: It is not the intent to require the structural elements supporting outside stairs, or structural elements that penetrate within exterior walls or any other wall not required to have a fire resistance rating, to be protected by fire-resistance-rated construction."

This change brings in line the intent between the two codes that these elements need to be protected when leaving fire resistance rated enclosures.

Bibliography: NFPA 101, Life Safety Code, 2024 Edition

Cost Impact: Increase

Estimated Immediate Cost Impact:

Cost impact information unchanged from original proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

Cost impact information unchanged from original proposal.

Comment (CAH2)# 354

E71-24

IBC: 1011.7.1; IFC: [BE] 1011.7.1

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. ~~Openings~~ Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated ~~openings~~ perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted the open ends of treads that do not extend to the face of the guard infill or wall shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.
3. ~~2~~ In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

2024 International Fire Code

Revise as follows:

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. ~~Openings~~ Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated ~~openings~~ perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted the open ends of treads that do not extend to the face of the guard infill or wall shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.
3. ~~2~~ In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

Reason: Although a tread has a solid surface the end of a tread often ends without actually abutting any surface. Such is the case on many open stairs or where open risers are allowed. Opening limitations in guards regulating the vertical plane are not applicable to the horizontal walking surface. This addition to the exception for openings in stair walking surfaces will provide much needed guidance for design and enforcement when the tread does not extend under the guard system or abut a wall, skirtboard, or other vertical surface. The 2 inch limit is reasoned as the maximum standoff used and is considerably smaller than the smallest of shoe sizes for children of 2 -6 months.

Common applications are pictured:

Illustration A: Glass panel is attached to the ends of treads with “standoff” hardware leaving a narrow gap between the glass

panel and the extreme end of the tread.

Illustration B: Shows the an open riser mono stringer stair with open ended treads.

In each case the exposed area is well out of the path of travel.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change provides specific technical requirements that provide clarification for enforcement of a common and highly desired design aesthetic without change to methods of construction or related costs of construction of the stair.

E71-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There was a discussion on if the edge of the tread would be considered a walking surface that was subject to the floor walking surface requirements or not. The committee had different opinions on if the gap at the side of a tread would be a hazard for persons on the stairway using a cane or crutches. Some members felt that if the gap was away from the walkline it would not be a safety hazard. The proposal should be brought back with some of the clarifications proposed in the floor modifications. (Vote: 8-4).

E71-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.7.1; IFC: [BE] 1011.7.1

Proponents: Ashley Goodin, Technical Services, Stairbuilders and Manufacturers Association (ashley.goodin@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* walking surfaces ~~treads and landings~~ shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Perforations in ~~*stair*~~ stairway walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted, the open ends of stairway walking surfaces ~~treads that do not extend to the face of the guard infill or wall,~~ shall extend to a point not more than ~~2~~ 1-1/2 inches (~~51~~ 38 mm) measured horizontally from the face of the adjacent guard infill or wall.
3. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

2024 International Fire Code

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* walking surfaces ~~treads and landings~~ shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where open risers are permitted, the stairway walking surfaces ~~open ends of treads that do not extend to the face of the guard infill or wall,~~ shall extend to a point not more than ~~2~~ 1-1/2 inches (~~51~~ 38 mm) measured horizontally from the face of the adjacent guard infill or wall.

3. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1\frac{1}{8}$ inches (29 mm) cannot pass through the opening.

Reason: The purpose of the original proposal and this comment is two-fold. The first is to clarify the orienation and size of perforations in stair tread surfaces. The second is to provide for consistent measurement and enforcement of openings as designed in "floating" tread configurations between stairways and adjacent guards.

In this conmment, feedback from the committe and others has benn considered and implemented through the following changes. The floor modifications Munsenteiger 1 has been integrated into this comment. Additionally, the floor modification Zuzik 1 has not been added, thus returning the intent and scope of the original proposal back to open riser stairs. This limits the areas where the proposed openings are allowed as open riser stairs are not allowed as an accessable means of egress. Further, comments from the committee regarding opening location and sizes relative to ambulatory aids and individuals with low vision have been taken into consideration and the opening size has been reduced to prevent accidental engagement of crutch and cane tips.

Currently, the code is silent on this measurement which leads to confusion as to whether the sphere measurement of 4" for guards from Section 1015.4 is being used. At open riser configurations such as are addressed in this comment, the 4" sphere rule also applies to the measurement between treads at the open riser. By implementing the measurement of 1-1//2" as proposed in this comment, both safety and clarity are added to the code in reducing the limitation from 4" to 1-1/2", thus reducing the opportunities for objects such as cane tips, crutches, or limbs to pass through the openings. Further, as the opening in question is located away from the walkline and below and away from the handrail further reduces the risk of accidental engagement of ambulatory aids or limbs in this space. As written, this proposed change increases safety for users and provides clarity for enforcement, therefore it should be considered for adoption within the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change does not add any additional materials or labor to the cost of construction, only clarifies a tolerance for enforcement.

Comment (CAH2)# 430

Comment 2:

IBC: 1011.7.1; IFC: [BE] 1011.7.1

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $\frac{1}{2}$-inch-diameter (12.7 mm) sphere. Elongated perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where ~~open risers are permitted~~ the open ends of treads ~~that~~ do not extend to the face of the guard infill or wall .the tread shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.

3. In Group F, H and S occupancies, other than areas of parking *structures* accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1\,^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

2024 International Fire Code

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached. **Exceptions:**

1. Perforations in *stair* walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated perforations shall be placed so that the long dimension is perpendicular to the direction of travel.
2. Where ~~open risers are permitted~~ the open ends of treads ~~that~~ do not extend to the face of the guard infill or wall <u>,the tread</u> shall extend to a point not more than 2 inches (51 mm) measured horizontally from the face of the guard infill or wall.
3. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1\,^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

Reason: One of the most miss interpreted enforcements in the field is when inspectors apply walking surface opening limits in place of the guard opening limits.

The edge of the walking surface is defined by were it stops. The protection for someone accidentally falling off an open sided walking surface is done by the requirement within the code with a guard.

The code does not require open sided walking surfaces to extend within a 1/2" of the guard infill or wall currently, as thus, when the 1/2" floor opening limit is applied by inspectors for were the code specifies the 4" sphere opening limit, it is over reaching and not the intent of the code.

The original proposal looked at addressing this by compromising with a 2" limit, however, the proposal was only for when the stair flight has open risers, but not for open sided treads? This comment brings to light to the committee that it should not matter if the stair flight has open risers or not, but rather if it has open sided treads for it's walking surface, and not enclosed by a stringer.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is already a guard or wall being constructed for these stair flights, as thus the cost is not seen for reducing the offset distance to the guard's infill or wall.

Comment (CAH2)# 746

E73-24

IBC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New); IFC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New)

Proposed Change as Submitted

Proponents: Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com); Brittany Lynch, Clanton & Associates, Clanton & Associates (brittany@clantonassociates.com); Eunice Noell-Waggoner, President, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Harold Jepsen, Legrand (harold.jepsen@legrand.com)

2024 International Building Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and 1011.7.2.2. **Exceptions:**

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

2024 International Fire Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and1011.7.2.2. **Exceptions:**

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

Reason: From Cohen and Pauls (2006) they cite the following statistics about stair safety. *"According to the National Public Services Research Institute, in 1995, it was estimated that stair-related injuries in the United States were associated with comprehensive costs of $50 billion, including $4.7 billion in medical costs, $7.1 billion in productivity losses, and $38.1 billion in quality of life losses (T. Miller, Personal Communication. 1998). Even the smallest of these component costs is astonishing relative to annual stair construction costs in the United States; these are only approximately $5 billion. With the possible exception of products, such as handguns, tobacco and illegal drugs, this 10-to-l ratio of injury costs to product production costs is extraordinary."*

Cohen and Pauls also note that increasing quantity of lighting alone is not sufficient to incease the visibility of the edge of the stair tread. *"In addition to lighting, there are other important factors in visibility of steps, including careful choice of stairway covering materials to avoid patterns that tend to camouflage the step nosings and the critical leading edges of treads. and to use highly contrasting tread markings."*

The Illuminating Engineering Society's Recommended Practice for Lighting and the Visual Environment for Older Adults and the Visually Impaired (IES-RP-28-20) notes the following concerning the use of reflectance contrast for increasing visibility: *Value contrast should be a design consideration in the selection of finishes for corridors, stairs, lobbies and spaces that become part of the path of egress. Contrast helps to define the space and the elements within the space, e.g., doorways, changes of floor level or direction, and obstructions such as columns, to increase visibility and the occupant's confidence. Everyone's sight benefits from value contrast in low-light conditions, regardless of age or visual acuity.*

The IES also recommends that *"All stairs should have clearly marked edge strips, staircase borders, and handrails to meet the needs of older people and persons with low vision."*

Similar to what has been recommended by Cohen and Pauls and the Illuminating Engineering Society, this proposal would increase the safety of stairways by increasing the reflectance contrast (and thus the luminance contrast) by requiring colored stripes on the nosing or leading edges of stairs. The difference in reflectance between the edge stripe and the rest of the stair tread will to increase the visibility of the edge of the stair. These colored stripes would be one to two inches wide on the edge of nosing the stair. This proposal is written the same format as the requirement as IBC *Section 1011.5.4.1 Nonuniform height risers*. However the distinguishing difference between stripes on nonuniform height risers and those proposed for all other stairs is "nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight."

The description of the marking stripes are written to be in alignment with ANSI/ICC 117.1 Accessibility Standard Section 504.6 "Visual Contrast". Addtionally this proposal modifies both Section 1011.5.4.1 and 1011.7.1 on the geometrical description of the contrasting marking stripe. Originally the stripe is defined as being one to two inches wide, this proposal more clearly defines the stripes as being one to two inches in depth and having a width that extends the width of the stair tread.

Bibliography: ANSI/IES RP-28-20. *Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired.* Illuminating Engineering Society. New York.

Cohen, Harvey and Pauls, Jake. *Warnings and Markings for Stairs and Pedestrian Terrain*. **Handbook on Warnings.** In: Michael Wogalter (Ed.),Lawrence Erlbaum, Inc., 2006, pp. 711-722.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The lowest cost method for adding a stripe to stairs is painting a stripe. However to provide conservatively high estimate we have used the cost of adding a metal nosing strip to the tread of each stair and on the nosing of the landing above a stair. From estimates of costs published on the internet the costs of aluminum stair nosing are $6 to $21 per linear foot. https://kofflersales.com/product/metal-stair-nosing Similar costs are found on Grainger's and Lowes websites.

Using a medium costs of $12.50/linear foot, the material cost of adding an aluminum nosing to a 4 foot wide tread is $50/stair. According

one home improvement website, “A beginner can install a nosing on a tread in 15 to 30 minutes.” https://www.thespruce.com/installing-a-stair-nosing-strip-1822570 According to the US Bureau of Labor Statistics, the Mean Labor wage for carpenter, US average May 2022 is $ 27.99/hr https://www.bls.gov/oes/current/oes472031.htm Thus the labor cost is $14 per step to install a $50 nosing strip for a total installed cost of $64/stair tread. With 50% overhead and profit for carpenters (2020 RS Means), total cost is $96 per installed 4 foot wide nosing. For a 12 foot tall story, with 6 inch risers per step, there are 24 nosings with an installed cost of 24 x $96 = $2,304 per story.

This cost for nosings is compared against the cost adding stairs per story. In the Economics of Egress Alternatives and Life-Safety Costs, NIST Special Publication 1109. September 2010. Gaithersburg, Maryland (https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication1109.pdf) describes the costs of adding an additional exit stair to a 13 story prototypical building as follows: “The baseline value for the life-cycle costs of installing an additional exit stair in Building 2 ranges from $1.5 million for the 44 in (112 cm) stair width to $2.4 million for the 66 in (168 cm) stair width.” The cost per story of this added exit stair is $1.5 Million/ 12 = $125,000 per story. The fractional cost of adding aluminum stair nosings strips is $2,300/$125,000 = 1.8

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding striping to stairs increases the cost of stairs by 1.8%. However, this cost is offset by the societal savings associated with avoiding trip and fall hazards on stairways.

Estimated Life Cycle Cost Impact:

In Cohen and Pauls, Warnings and Markings for Stairs and Pedestrian Terrain (see bibliography), they estimate that the ratio of the cost of annual injuries on stairs to the annual cost of stair construction is 10 to one. The annual construction rate of nonresidential buildings is 1.3% (table B7 of the US EIA 2012 Commercial Buildings Energy Consumption Survey). Thus the annual value of injuries on stairs are 10 x 0.013 = 13% of the value of the stock of all stairs. Assuming that metal nosing lasts at least 10 years, the ratio of the value of injuries on stairs over 10 years to cost of the stairs is 10 x 13% = 130% of the value of the stairs. As described in the cost impact statement, a conservatively high estimate of the cost of stair striping is 1.8% of total stair cost. Thus, the ratio of the cost of stair striping to the cost of injuries on stairs is 1.8%/130% = 1.4%. If stair striping reduces injuries on stairs, by 1.4% this will pay for the added cost of striping stairs by adding an aluminum nosing that is conspicuously different than the reflectance of the rest of the stair tread. Given the mechanisms of how falls are induced on stairs, we expect that stair striping will reduce the percentage of falls significantly more than 1.4%.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

If the striping reduces falls in stairs by any amount greater than 1.4%, life cycle cost is decreased.

In Cohen and Pauls, Warnings and Markings for Stairs and Pedestrian Terrain, they identify three factors to stair safety.

1. visibility of the stair flight and its individual steps, especially when viewed in descent;

2. adequacy and uniformity of step dimensions in relation to human gait; and

3. availability of reachable, graspable handrails that also provide accurate visual cues about the presence and location of steps.

Items 2 is addressed by IBC Section 1011.5. Item 3 is addressed by IBC section 1011.11. Visibility is only partially addressed by illuminance requirements in IBC Section 1008. Critical to visibility of steps is the luminance contrast of the tread edge; luminance contrast is the ratio of reflected light from the stair edge as compared to other surfaces on the stair. When stairs are uniformly illuminated, luminance contrast is a function of reflectance contrast of the stair edge from the surrounding tread and riser. Increasing illuminance without adjusting the ratios of surface reflectances of stair edge from its surroundings does not increase luminance contrast because with increasing illuminance, the luminance of both the stair edge and its surroundings will both rise proportionately and thus the ratio of the stair edge to its surroundings have not changed. We expect that lack of reflectance contrast is a significant cause of falls on stairs and thus addressing this issue will result in substantially more savings associated with avoided injuries and deaths than its first cost. Reducing stairway falls by only 1.4% will pay for the cost of the stair striping. See the calculations below for the rationale.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: While contrast on stairways is important, the proposed requirements are not clear. The committee felt that the language was not clear enough to apply consistently and correctly in the field. The terms 'steps' is not defined in the code - this should be 'treads'. The requirements for the treads and landings should be in Sections 1011.5 and 1011.6. The application of this to "interior and exterior stairways" would include to all convenience stairways (exit access), as well as stairways in the exit discharge - this is over reaching. Are there any studies that have taken into consideration stairway continuity and handrails to address the safety concerns brought up by the proponents? What would be an acceptable material for the stripes? How would you verify contrast on stairways that were not a solid color? See also E74-24. (Vote: 13-1)

E73-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.5, 1011.5.4.1, 1011.7.2, 1011.7.2.1, 1011.7.2.2, 1011.6, 1011.6.1 (New); IFC: [BE] 1011.5, [BE] 1011.5.4.1, 1011.7.2, 1011.7.2.1, 1011.7.2.2, [BE] 1011.6, [BE] 1011.6.1 (New)

Proponents: Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through ~~1011.5.5.3~~ 1011.5.6.

1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

Revise as follows:

~~**1011.7.2 Markings on stairways .** Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and 1011.7.2.2.~~

~~**Exceptions:**~~

1. ~~Stairways within individual dwelling units.~~

~~2. Stairways with stripes complying with Section 1025.~~

~~**1011.7.2.1**~~ **1105.6** ~~**Steps**~~ **Marking stripes on tread nosings.** For interior exit stairways and exterior exit stairways, the leading 1 to 2 inches (25 to 51 mm) of every tread nosing shall have a marking stripe of a solid color that is lighter or darker than the remainder of the tread. The marking stripe shall be durable and shall extend from one side of the tread to the other side of each tread.~~A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark on light or light on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.~~

Exceptions:

1. Portions of treads with distinctive marking stripes complying with Section 1011.5.4.1.
2. Stairways with stripes complying with Section 1025.

Delete without substitution:

~~**1011.7.2.2 Landings.** The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.~~

1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

1011.6.1 Marking stripes on landing nosings. For *interior exit stairways* and *exterior exit stairways*, the nosing of all landings shall have a marking stripe complying with Section 1011.5.6.

2024 International Fire Code

[BE] 1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through ~~1011.5.5.3~~ 1011.5.6.

[BE] 1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The nosings at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

~~**1011.7.2 Markings on stairways .** Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 and1011.7.2.2.~~

~~**Exceptions:**~~

1. ~~Stairways within individual dwelling units.~~
2. ~~Stairways with stripes complying with Section 1025.~~

Revise as follows:

[BE] ~~**1011.7.2.1**~~ **1011.5.6** ~~**Steps**~~ **Marking stripes on tread nosings.** For interior exit stairways and exterior exit stairways, the leading 1 to 2 inches (25 to 51 mm) of every tread nosing shall have a marking stripe of a solid color that is lighter or darker color than the remainder of the tread. The marking stripe shall be durable and shall extend from one side of the tread to the other side of each tread.~~A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark on light or light on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface~~.

Exceptions:

1. Portions of treads with distinctive marking stripes complying with Section 1011.5.4.1.
2. Stairways with stripes complying with Section 1025.

Delete without substitution:

~~**1011.7.2.2 Landings.** The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.~~

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

[BE] 1011.6.1 Marking stripes on landing nosings. For *interior exit stairways* and *exterior exit stairways*, the nosing of all landings shall have a marking stripe complying with Section 1011.5.6.

Reason: This modified proposal attempts to include a fundamental safety feature into stairways, striping that delineates the edge of the nosing of the landing and the nosing of the stair tread. This is an extremely inexpensive features that is valuable for people with excellent vision but especially important for the visually impaired -- something that occurs to almost all with age. Many people wear bifocals designed for reading. This same feature creates a blurred view of edge of the tread or landing, whereas a contrasting marking is still visible and is not distorted. (See Reference for Herren et al. 2009).

The committee's comments were extremely helpful and the following responses describe how this revised proposal addressed these comments:

Comment: More clarity desired The terms 'steps' is not defined in the code - this should be 'treads'. The requirements for the treads and landings should be in Sections 1011.5 and 1011.6.

Response: This recommendation was followed by moving the requirements to Section 1011.5.6 "Marking stripes on tread nosings" and Section 1011.6.1 "Marking stripes on landing nosings."

Comment: The application of this to "interior and exterior stairways" would include to all convenience stairways (exit access), as well as stairways in the exit discharge - this is over reaching.

Response: As an initial proposal that addresses visibility of stairs we agree that this proposal should be limited to the areas with the greatest potential for significant injury. As a result, this modification to the proposal would limit the requirement for stripes on the nosing of treads and landings to interior exit stairways and exterior exit stairways. This scope is relatively easy to enforce as the building official can readily identify what ways are protected and does not have to parse whether the stairway is designated as accessible or not. In addition to protecting the visually impaired, this proposal is protective of the general population who also fall on stairs. With this reduced scope less exceptions are necessary.

Comment: What would be an acceptable material for the stripes? How would you verify contrast on stairways that were not a solid color? See also E74-24.

Response: This proposal asks that the stripe be durable and qualitatively have a contrast of light-on- dark or dark-on- light without a quantitative criteria. This qualitative light-on- dark or dark-on- light visual contrast criteria is the same as what is in Section 504.6 "Visual Contrast" in ICC A117.1-2017. The modified proposal to E74-24 discusses quantitative reflectance ratios that result in visual contrast that would also comply with the updates approved by the accessibility committee for ICC A117.1-2025.

Comment: Are there any studies that have taken into consideration stairway continuity and handrails to address the safety concerns brought up by the proponents? What would be an acceptable material for the stripes?

Response: The safety system for stairs is to have enough luminance contrast to detect the edge of the stair and also to have a handrail to catch oneself. Stair striping is like having good brakes before relying on the airbag of a car or the handrail to break one's fall. The original proposal provided a number of research studies on contrast and visibility and falls. A more recent study is from 2011 "Stepping characteristics and Centre of Mass control during stair descent: Effects of age, fall risk and visual factors," they concluded that "high stair edge contrast has a beneficial effect on balance control in older adults." **Comment:** How would you verify contrast on stairways that were not a solid color?

Response: Proposal 73 only asks for light on dark contrast without a specifying criteria. Though this criteria is qualitative, a building official can easily make the judgement call if there is no marking stripe at all. Installing white or yellow stripes on stairs are a pretty safe selection for most stairs even those that have patterned treads. Note that change in scope to interior exit stairways and exterior exit stairways reduces the likelihood that the stairs will be patterned.

Bibliography: Doerte Zietz, Leif Johannsen, & Mark Hollands. 2011. *Stepping characteristics and Centre of Mass control during stair descent: Effects of age, fall risk and visual factors*, **Gait & Posture.** Volume 34, Issue 2 , June 2011, pp. 279-284. https://doi.org/10.1016/j.gaitpost.2011.05.017

Mark J Haran et al. 2009. *Preventing falls in older multfocal glasses wearers by providing single-lens distance glasses: the protocol for the VISIBLE randomised controlled trial.* **BMC Geriatrics** 2009, 9:10 doi:10.1186/1471-2318-9-10

ICC A117.1-2025 *Standard for Accessible and Usable Buildings and Facilities* as approved by the ICC A117.1 development committee. Section 505.9. Note that this section used to be Section 504.6 "Visual contrast".

Cost Impact: Increase

Estimated Immediate Cost Impact:

See original cost estimate from original proposal, approximately $2,300 per story or approximately 1.8% of the cost of the stair.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original cost justification from original proposal. Estimate is that injuries have a value of 13% of the cost of the stair per year. Breakeven cost is if striping reduces injuries by 1.4%

Estimated Life Cycle Cost Impact:

See original cost-effectiveness justification from original proposal. Breakeven cost is if striping reduces injuries by 1.4%

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See original cost-effectiveness justification from original proposal.

Comment (CAH2)# 643

E74-24

IBC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New), 1011.7.2.3 (New), ASTM Chapter 35 (New); IFC: 1011.7.2 (New), 1011.7.2.1 (New), 1011.7.2.2 (New), 1011.7.2.3 (New), ASTM Chapter 80 (New)

Proposed Change as Submitted

Proponents: Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Nancy Clanton, Clanton & Associates, Inc, Clanton & Associates, Inc. (nancy@clantonassociates.com)

2024 International Building Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3. **Exceptions:**

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

1011.7.2.3 Light reflectance. The stripe light reflectance value (LRV) and the tread surface LRV shall be determined in accordance with ASTM E1331. The stripe LRV shall comply with one of the following:

1. Stripe LRV shall be no less than stair tread LRV plus 65.
2. Stripe LRV shall be no greater than stair tread LRV minus 65.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1331-15 (2019)	Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

2024 International Fire Code

Add new text as follows:

1011.7.2 Markings on stairways. Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3. **Exceptions:**

1. Stairways within individual dwelling units.
2. Stairways with stripes complying with Section 1025.

1011.7.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark-on-light or light-on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.

1011.7.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

1011.7.2.3 Light reflectance. The stripe light reflectance value (LRV) and the tread surface LRV shall be determined in accordance with ASTM E1331. The stripe LRV shall comply with one of the following:

1. Stripe LRV shall be no less than stair tread LRV plus 65.
2. Stripe LRV shall be no greater than stair tread LRV minus 65.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E 1331-15	ASTM E1331-15 (2019) Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

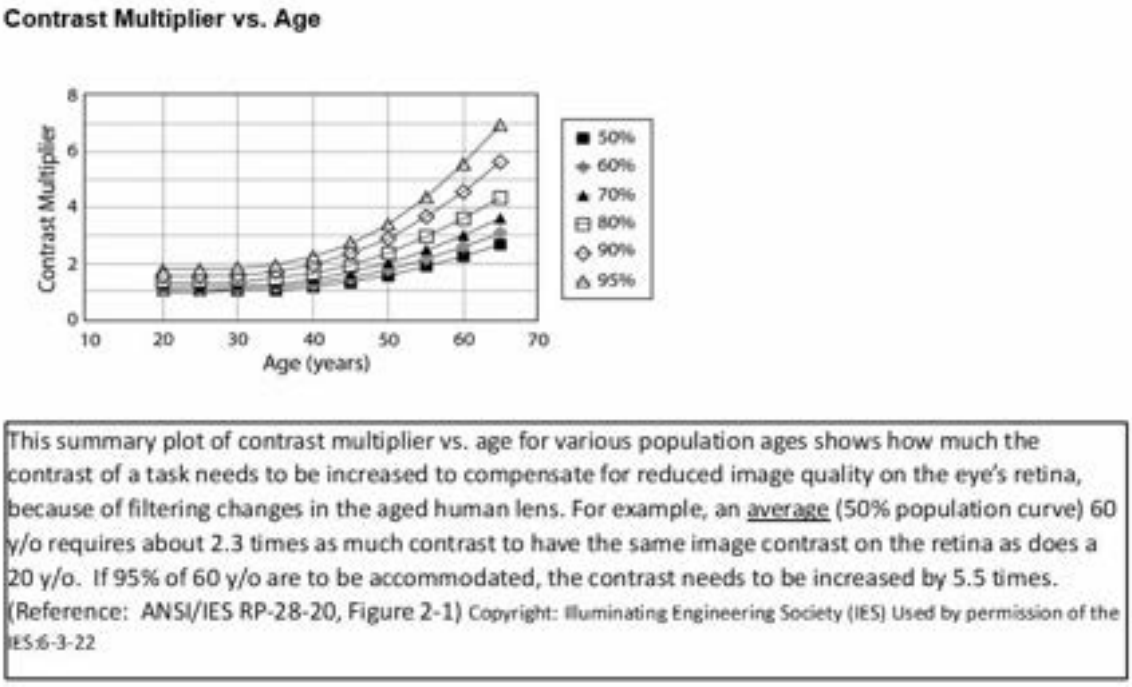
Reason: The Importance of Contrast on Stairs

Expanding Baby Boom Cohort: (Official Website of the U.S. Government, Report No. P25-1141)

- By 2029 20% of the US population will be over age 65.
- By 2056 the US population 65+will be larger than the population under 18 years.
- Why aren't building codes keeping pace with the requirement for our aging population?

Age-Related Vision Changes: Sensory loss is the most common aspect of aging; however, perception problems (e.g. vision and hearing) are not easily recognized by others or addressed in the built environment.

- **Low Vision is prevalent in the older population** and increases dramatically at the age of 70. Defined as 20/60 in the better seeing eye, and cannot be corrected with glasses, contact lenses, medicine, or surgery. (National Eye Institute, Low Vision 2010)
- **We see by visual contrast** and as people age, they experience a loss of contrast sensitivity.
- **Contrast sensitivity, not visual acuity, is associated with gait and fall related risk factors in older adults.** Research article: Duggan et al (2017) Time to refocus assessment of vision in older adults? Contrast sensitivity, but not visual acuity is associated with the gait of older adults. Journal of Gerontology :Medical Sciences doi: 10.1093/geona/glx21



This summary plot of contrast multiplier vs. age for various population ages shows how much the contrast of a task needs to be increased to compensate for reduced image quality on the eye's retina, because of filtering changes in the aged human lens. For example, an average (50% population curve) 60 y/o requires about 2.3 times as much contrast to have the same image contrast on the retina as does a 20 y/o. If 95% of 60 y/o are to be accommodated, the contrast needs to be increased by 5.5 times. (Reference: ANSI/IES RP-28-20, Figure 2-1)

Falls and stair negotiation in older people and their relationship with vision The prevalence and morbidity of falls (NIH National Library of Medicine, National Center for Biotechnology Information). Falls are a common and very serious problem for older adults, with approximately one-third of community-dwelling, healthy adults aged 65 years and over falling at least once per year, and with up to half of these people experiencing multiple falls. Annual falls rates increase to about 50% in people aged 85 years and over. Approximately 25% of falls result in an injury ranging from minor bruising to hip fracture. Hip fractures are a particularly severe consequence of falling, with the 1-year mortality rate following hip fracture being about 25%. In addition, 80% of surveyed older women suggested that they would rather be dead than experience the loss of independence and quality of life that results from a hip fracture and subsequent admission to a nursing home. Falls and hip fractures are mentioned as a contributing factor in 40% of admissions to long-term nursing and residential home care. Furthermore, even non-injurious falls have significant consequences, as they can lead to a fear of falling, which, in turn, results in a self-imposed restriction of functional activity, decreased mobility and independence, social isolation, deteriorating health, depression and reduced quality of life. **Incidences of falling in older people have been consistently linked to problems with step or stair negotiation.** Changes in visual acuity may be more associated with falls than the actual level of visual acuity, and other aspects of vision (such as visual field assessments, contrast sensitivity and stereoacuity are likely to be more important risk factors than visual acuity for falls.

According to CDC data, 38.6% of senior falls occur on level ground, but a significant 5.5% of all senior falls occur on stairs or steps.

Falls in Older Adults - Older People's Health Issues Merck Manuals https://www.merckmanuals.com › home › falls-in-older-...After a fall, injuries are common and tend to be more severe as people age. Over half of all falls result in at least a slight injury, such as a bruise, sprained ligament, or strained muscle. More serious injuries include broken bones, torn ligaments, deep cuts, and damage to organs such as the kidney or the liver.

The information cited in Cohen and Pauls (2006) is still valuable. The information provided above is focus on age-related changes to vision and the risk factor for falls on stairs due to these changes.

Contrast at the edge of stair treads defines where to safely step and helps prevent falls. Cohen and Paul also note that increasing quantity of lighting alone is not sufficient to increase the visibility of the edge of the stair tread. "In addition to lighting, there are other important factors in visibility of steps, including careful choice of stairway covering materials to avoid patterns that tend to camouflage the step nosings and the critical leading edges of treads. **and to use highly contrasting tread markings.**"

The Illuminating Engineering Society's Recommended Practice for Lighting and the Visual Environment for Older Adults and the Visually Impaired (IES-RP-28-20) notes the following concerning the use of reflectance contrast for increasing visibility: Value contrast should be

a design consideration in the selection of finishes for corridors, stairs, lobbies and spaces that become part of the path of egress. Contrast helps to define the space and the elements within the space, e.g., doorways, changes of floor level or direction, and obstructions such as columns, to increase visibility and the occupant's confidence. Everyone's sight benefits from value contrast in low-light conditions, regardless of age or visual acuity.The

IES also recommends that "*All stairs should have clearly marked edge strips, staircase borders, and handrails to meet the needs of older people and persons with low vision*."

Similar to what has been recommended by Cohen and Pauls and the Illuminating Engineering Society, this proposal would increase the safety of stairways by increasing the visual contrast (and thus the luminance contrast) by requiring contrast stripes on the nosing or leading edges of stairs. The difference in reflectance between the edge stripe and the rest of the stair tread will increase the visibility of the edge of the stair. These contrasting stripes would be one to two inches wide on the edge of nosing the stair but would allow 3" wide nosing on concrete stairs to provide adequate attachment to the tread. This proposal is written the same format as the requirement as IBC Section 1011.5.4.1 Nonuniform height risers. However the distinguishing difference between stripes on nonuniform height risers and those proposed for all other stairs is "nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight."

The description of the marking stripes are written to be in alignment with ANSI/ICC 117.1 Accessibility Standard Section 504.6 "Visual Contrast". Additionally this proposal modifies both Section 1011.5.4.1 and 1011.7.1 on the geometrical description of the contrasting marking stripe. Originally the stripe is defined as being one to two inches wide, this proposal more clearly defines the stripes as being one to two inches in depth and having a width that extends the width of the stair tread.

Bibliography: United State Government Report #P25-1141)
National Eye Institute, Low Vision 2010.

Journal of Gerontology Medical Sciences Research Article: doi: 10.1093/geona/glx21.

CDC ,Older Adult Falls Data | Fall Prevention | Injury Center | CDC

ANSI/IES RP-28-20. Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired. Illuminating Engineering Society. New York.

NIH National Library of Medicine, National Center for Biotechnology Information.

CDC data: Significant number of falls for Seniors occurred on stairs and steps.

Falls in Older Adults - Older People's Health Issues Merck Manuals https://www.merckmanuals.com › home › falls-in-older-.

Cohen, Harvey and Pauls, Jake. Warnings and Markings for Stairs and Pedestrian Terrain. Handbook on Warnings. In: Michael Wogalter (Ed.),Lawrence Erlbaum, Inc., 2006, pp. 711-722.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The lowest cost method for adding a stripe to stairs is painting a stripe. However to provide conservatively high estimate we have used the cost of adding a metal nosing strip to the tread of each stair and on the nosing of the landing above a stair. From estimates of costs published on the internet the costs of aluminum stair nosing are $6 to $21 per linear foot. https://kofflersales.com/product/metal-stair-nosing Similar costs are found on Grainger's and Lowes websites.

Using a medium costs of $12.50/linear foot, the material cost of adding an aluminum nosing to a 4 foot wide tread is $50/stair. According

one home improvement website, “A beginner can install a nosing on a tread in 15 to 30 minutes.” https://www.thespruce.com/installing-a-stair-nosing-strip-1822570 According to the US Bureau of Labor Statistics, the Mean Labor wage for carpenter, US average May 2022 is $ 27.99/hr https://www.bls.gov/oes/current/oes472031.htm Thus the labor cost is $14 per step to install a $50 nosing strip for a total installed cost of $64/stair tread. With 50% overhead and profit for carpenters (2020 RS Means), total cost is $96 per installed 4 foot wide nosing. For a 12 foot tall story, with 6 inch risers per step, there are 24 nosings with an installed cost of 24 x $96 = $2,304 per story.

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding striping to stairs increases the cost of stairs by 1.8%. However, this cost is offset by the societal savings associated with avoiding trip and fall hazards on stairways.

Estimated Life Cycle Cost Impact:

Overall life cycle impact is negative meaning that society has an overall benefit from the increased visibility of change of level in stairs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

In Cohen and Pauls Warnings and Markings for Stairs and Pedestrian Terrain (see bibliography), they cite that "Stair-related injuries alone were estimated to have a societal cost of nearly 50 billion dollars in 1995."

E74-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Same reasons as E73-24. In addition, the width of the stripes should be a maximum of 2 inches. There were several issues brought up during the testimony regarding testing - how and where do you take the measurements? Can interpretations be based on plans, or is the only option to field verify? Direction must be provided for the code official. ASTM E1331-15 does not specifically address contrast. This is not the right standard. This is already addressed in Section 1025.4. (Vote: 13-1)

E74-24

Individual Consideration Agenda

Comment 1:

IBC: 1011.5, 1011.5.4.1, 1011.7.2, 1011.7.2.1, 1011.7.2.3, 1011.5.6.1.1 (New), 1011.7.2.2, 1011.6, 1011.6.1 (New), ASTM Chapter 35; IFC: [BE] 1011.5, [BE] 1011.5.4.1, 1011.7.2, 1011.7.2.1, 1011.7.2.3, [BE] 1011.5.6.1.1 (New), 1011.7.2.2, [BE] 1011.6, 1011.6.1 (New), ASTM Chapter 80

Proponents: Jonathan McHugh, McHugh Energy Consultants Inc., California Investor Owned Utilities (jon@mchughenergy.com); Eunice Noell-Waggoner, Center of Design for an Aging Society, IES Lighting for Seniors and the Visually Impaired Committee (eunice@centerofdesign.org); Koni Sims, ACB Board of Director, American Council of the Blind (ACB), Visually Impaired/Low Vision (koni.l.sims@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through ~~1011.5.5.3~~ 1011.5.6.

1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

~~**1011.7.2 Markings on stairways .** Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3.~~

~~**Exceptions:**~~

1. ~~Stairways within individual dwelling units.~~
2. ~~Stairways with stripes complying with Section 1025.~~

~~**1011.7.2.1**~~ **1011.5.6** ~~**Steps**~~ **Marking stripes on tread nosings.** For *interior exit stairways* and *exterior exit stairways*, the leading 1 to 2 inches (25 to 51 mm) of every tread *nosing* shall have a marking stripe of a solid color that is lighter or darker than the remainder of the tread. The marking stripe shall be durable and shall extend from one side of the tread to the other side of each tread.~~A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark on light or light on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.~~

Exceptions:

1. Portions of treads with distinctive marking stripes complying with Section 1011.5.4.1.
2. Stairways with stripes complying with Section 1025.

Revise as follows:

~~**1011.7.2.3**~~ **1011.5.6.1 Light reflectance value.** The average light reflectance value (LRV) of the lighter surface shall be no less than 50, and the average LRV of the darker surface shall be no greater than 35% of the average LRV of the lighter surface. The marking stripe light reflectance value (LRV) and the tread and landing surface LRV shall be the percent light reflectance value measured ~~determined~~ in accordance with ASTM E1331. For field measurements including those in a mock-up of a sample tread or landing, the reported LRV or CIE Y value measured by a colorimeter shall also be an allowed method of determining LRV.~~The stripe LRV shall comply with one of the following:~~

1. ~~Stripe LRV shall be no less than stair tread LRV plus 65.~~
2. ~~Stripe LRV shall be no greater than stair tread LRV minus 65.~~

Exceptions:

1. Treads and landings where the LRV of a background material cannot be accurately measured, such as a natural material, and where the marking stripe is lighter or darker than the remainder of the tread and landing.
2. Where the marking stripe is yellow that approximates traffic yellow.

Add new text as follows:

1011.5.6.1.1 Compliance. Compliance for the light reflectance value (LRV) shall be determined by at least one of the following:

1. Documentation provided by the manufacturer based on information from the supplier of the material.

2. Documentation of compliance by a testing agency.

3. Field measurement including mock-up.

~~**1011.7.2.2 Landings.** The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.~~

1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

Add new text as follows:

1011.6.1 Marking stripes on landing nosings. For *interior exit stairways* and *exterior exit stairways*, the *nosing* of all landings shall have a marking stripe complying with Section 1011.5.6.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E1331-15 (2019)	Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

2024 International Fire Code

[BE] 1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 1011.5.1 through ~~1011.5.5.3~~ 1011.5.6.

[BE] 1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The nosings at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair*. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

Revise as follows:

~~**[BE] 1011.7.2 Markings on stairways.** Egress path markings shall be provided on interior and exterior stairways in accordance with Sections 1011.7.2.1 through 1011.7.2.3.~~

~~**Exceptions:**~~

1. ~~Stairways within individual dwelling units.~~
2. ~~Stairways with stripes complying with Section 1025.~~

[BE] ~~**1011.7.2.1**~~ **1011.5.6** ~~**Steps**~~ **Marking stripes on tread nosing.** For *interior exit stairways* and *exterior exit stairways*, the leading 1 to 2 inches (25 to 51 mm) of every tread *nosing* shall have a marking stripe of a solid color that is lighter or darker than the remainder of the tread. The marking stripe shall be durable and shall extend from one side of the tread to the other side of each tread.~~A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Stripes shall be a solid color having a visual contrast of dark on light or light on dark from the remainder of the tread or landing surface. Stripes have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 3 inches (76 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than 1/2 inch (12.7 mm) down the vertical face of the step. The stripe shall be of material that is at least as slip resistant as the other tread surface.~~

Exceptions:

1. Portions of treads with distinctive marking stripes complying with Section 1011.5.4.1.
2. Stairways with stripes complying with Section 1025.

Revise as follows:

[BE] ~~**1011.7.2.3**~~ **1011.5.6.1 Light reflectance value.** The average light reflectance value (LRV) of the lighter surface shall be no less than 50, and the average LRV of the darker surface shall be no greater than 35% of the average LRV of the lighter surface. The marking stripe light reflectance value (LRV) and the tread and landing surface LRV shall be the percent light reflectance value measured ~~determined~~ in accordance with ASTM E1331. For field measurements including those in a mock-up of a sample tread or landing, the reported LRV or CIE Y value measured by a colorimeter shall also be an allowed method of determining LRV~~The stripe LRV shall comply with one of the following:~~

1. ~~Stripe LRV shall be no less than stair tread LRV plus 65.~~
2. ~~Stripe LRV shall be no greater than stair tread LRV minus 65.~~

Exceptions:

1. Treads and landings where the LRV of a background material cannot be accurately measured, such as a natural material, and where the marking stripe is lighter or darker than the remainder of the tread and landing.
2. Where the marking stripe is yellow that approximates traffic yellow.

Add new text as follows:

[BE] 1011.5.6.1.1 Compliance. Compliance for the light reflectance value (LRV) shall be determined by at least one of the following:

1. Documentation provided by the manufacturer based on information from the supplier of the material.
2. Documentation of compliance by a testing agency.
3. Field measurement including mock-up.

~~**[BE] 1011.7.2.2 Landings.** The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.~~

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of *stairways* served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the *stairway* or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces. **Exceptions:**

1. Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1030.
2. Where curved *stairways* of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower *flight* at the landing *nosing* and the intersection of the walkline of the upper *flight* at the *nosing* of the lowest tread of the upper *flight*.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the *flight* served.

Add new text as follows:

1011.6.1 Marking stripes on landing nosings. For *interior exit stairways* and *exterior exit stairways*, the *nosing* of all landings shall have a marking stripe complying with Section 1011.5.6.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

E 1331-15	ASTM E1331-15 (2019) Standard Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

Reason: This proposal quantifies the required reflectance of a marking stripe that delineates the edge or nosing of the stair tread and the nosing of landings above stairs so that there is enough visual contrast between the edge of these surfaces and the surfaces themselves. These stripes are critical in preventing falls which has significant impact on fatalities and injury. The original proposal details the significant societal costs associated with falls on stairs.Recognizing the risk associated with not striping stairs and landings, the following countries have requirements for contrasting striping on stairs with specific reflectance requirements to create visual contrast between the leading edge of stairs and the rest of the treads and landings:
Great Britain
Germany
Australia

The reflectances required by this proposal result in luminance differences between the stripe and the background surface that have a Weber Contrast Ratio of 65%. The ICC A117.1 committee determined this 65% minimum Weber contrast to be protective against fall and trip hazards similar what was recommended by ISO 21542:2021. Weber contrast is a function of the relative light reflectance value (LRV) of the tread and the contrasting stripe.

Additionally, the ISO requires that the lighter surface have a LRV between100 and 50 (percent values) to maintain discrimination for the visual task as there is less discrimination between having dark and very dark colors. In ISO 21542:2021, they reference CIE Y which is directly equivalent to LRV. The ICC A117.1 committee has used the Weber Contrast Ratio formula as follows:

$$Cw = (Rlight - Rdark)/Rlight$$

Where,
Cw = Weber contrast ratio
Rdark = reflectance value of darker surface (lower reflectance)
Rlight = reflectance value of lighter surface (higher reflectances)

For simplicity we have used the ratio of reflectances of the stripe and the background. Rearranging the terms in the Weber formula results in a much simpler equation for determining the maximum ratio of the darker (lower) reflectance to the lighter (higher) reflectance.

Cw = (Rlight – Rdark)/Rlight = 1- Rdark/Rlight

1-Cw = Rdark/Rlight

Where

If Cw (Weber contrast) is required to be greater than 65%, then 1- Cw must be less than 35%.

As a result the ratio of the darker colored surface shall be less than 35% of the reflectance of the lighter colored surface. This LRV ratio in conjunction with the requirement that the LRV of the lighter (higher reflectance) surface be greater than 50 forms the basis of the light reflectance requirements in Section 1011.5.6.1

This proposal makes use of ASTM E1331-2015 which a repeatable method for measuring reflectances of paints, and surface reflectance. It also addresses how to measure high gloss (exclude specular component) versus low gloss (include specular component) surfaces. During the code action hearing, stakeholders asked how this standard would be enforced. This proposal added a compliance section to identify the many methods of showing compliance including manufacturer's documentation of LRV and on-site measurements. For laboratory settings that would be used to define product properties the ASTM test method makes for an accurate measurement of light reflectance value (LRV). However in updating this proposal we identified that this was limiting in terms of the inexpensive handheld products that would be appropriate for on-site measurements including those measurements that are on-site at a mock-up of the tread or landing and marking stripe. Thus for these on-site measurements, the allowable test methods were expanded to allow the use of relatively inexpensive colorimeters without an internal integrating sphere to measure the light reflectance value. Portable colorimeters are frequently used for color matching of paints to a preexisting surface and many provide the direct measurement of LRV or "CIE Y," the CIE luminance value in the CIE XYZ color space. Both LRV and CIE Y are equivalent.

This proposal also allows the use of a traffic yellow marking stripe in lieu of a marking stripe with a defined LRV relative to the tread or landing. Prior research conducted by the US Department of Transportation "Detectable Warning Surfaces: Color Contrast and Reflectance" found that high luminance contrast was more readily detected by people with visual impairment but they also found that safety yellow was most frequently chosen as "most visually detectable." The ICC A117.1 Committee has recommended that in most cases SAE AMS-STD-595A, Color ID 33538 International Yellow (also known as traffic yellow) be the required color for detectable sources in Section 705.3. "Contrast" in A117.1-2025 as this color "provides a high level of conspicuity for a given level of luminance contrast." There are already many products that meet this color specification and it is a recognized color for warning pedestrians of curb ramps and travelers the edge of rail platforms and the like. This specification has been in the California Building code in Chapter 11B Section 11B-705.1.1.3.1 as the primary method of complying with the detectable surfaces requirement as follows: "Detectable warning surfaces shall be yellow and approximate 33538 of SAE AMSSTD-595A.". In the SAE standard, color ID 33538 is listed as having CIELAB color coordinates of L* = 72.9, a* = 22.93, b* =72.42 when measured under a D65 illuminant and is listed as any of the following color names: Yellow International, Traffic Yellow, or ANA 614. This proposal is making use of the commonly recognized paint color name Traffic Yellow.

As an exception, the marking stripe being yellow and approximating the color of traffic yellow removes compliance uncertainty associated with the proposed requirements when tread reflectance is not known in advance. A stripe closely approximating traffic yellow can always be used regardless of the tread or landing surface background reflectance. This addresses variegated stairs, concrete stairs where the surface reflectance might very depending upon the concrete mix or how the surface is finished. However for designers not wishing to use a yellow stripe they can select a marking stripe with a light reflectance value relative to the reflectance of the tread as required in section 1011.5.6.1. Commenters had also brought up the concern of the feasibility of placing a colored stripe on stair treads made out of metal grating. The requirement allows a stripe between 1 and 2 inches wide. We found many metal stair treads that have at least a 1" solid sheet metal nosing on the front edge of the tread. In the committee's reason statement there were some very useful questions that are answered below:

Comment: The width of the stripes should be a maximum of 2 inches.

Reply: Agreed, this is change is in the introductory phrase to revised Section 1011.7.2 (Visual Contrast between Striping and Stairway Treads and Landings) "The leading 1 to 2 inches (25 to 51 mm) of every tread and landing shall be a stripe of a solid color with a visual contrast…"

Comment: There were several issues brought up during the testimony regarding testing - how and where do you take the measurements? Can interpretations be based on plans, or is the only option to field verify? Direction must be provided for the code official.

Reply: In response to this comment, the proposal was modified to add Section 1105.6.1.1 (Compliance) which describes the three ways one can show compliance: manufacturer's data, test data or field measurement (including mock-ups).

Comment: ASTM E1331-15 does not specifically address contrast. This is not the right standard. This is already addressed in Section 1025.4.
Reply: Section 1025.4 addresses self-luminous and photoluminescent materials. Self luminous materials are materials that emit light (such as tritium) and photoluminescent materials are those that store physical changes from absorbed light and re-emit light over time. This proposal is addressing the reflectance value of stripes that rely on illumination to instantaneously provide varying amounts of luminance contrast based on the reflectance of the stripe and the background surface. The newly defined contrast requirements in A117.1 are based on the Weber contrast relationship between the marking stripe reflectance and its background. This proposal only describes reflectance requirements without introducing the more complex equations associated with Weber Contrast. ASTM E1331-15 does not directly address contrast; it is a test method for measuring reflectance. In modifying this proposal, we have not introduced the term contrast as compliance is solely based on the ratio of reflectances of the marking stripe and the tread or landing surface.

Comment to Proposal 73: How would you verify contrast on stairways that were not a solid color?
Reply: Proposal 74 has specific average reflectance criteria and addresses this issue in four ways:
1. If the variability does not have much spatial distribution (i.e. granite with light and dark flecks but the overall color is relatively uniform), the measurement port of the reflectometer provides the needed averaging.
2. If the variability is large with large elements of dark and light, averaging is accomplished by measuring multiple locations and averaging the results.
3. The proposal E74-24 as modified specifically exempts “Treads and landings where the LRV of a background material cannot be accurately measured, such as a natural material, and where the marking stripe is lighter or darker than the remainder of the tread and landing.”
4. Also is exempted is "Where the marking stripe is yellow that approximates traffic yellow."

Note that all methods of compliance require the presence of a marking stripe, the last two do not require a measurement of reflectance contrast.

During the initial code action hearing on this proposal some commenters asked the question concerning how this would be enforced. The most common method would be for the manufacturers of stair striping and stair treads to provide light reflectance values (LRV) of these products and designer would provide these values as part of their submittal. The manufacturer could test the materials themselves or could have a test lab take the measurements. These measurements are simple and inexpensive. In some cases the data is not readily available from the manufacturer, a mock-up could be constructed, and the designer could ask for pre-approval from the AHJ based on the mock-up. Occasionally it might be required to take a site measurement. A small handheld colorimeter that reports either LRV or CIE Y values can be used to take the measurements.

Bibliography: BS 8493:2008+A1:2010 *Light reflectance value (LRV) of a surface. Method of test*. British Standards Institution

BS 8300-1: 2018 *Design of an accessible and inclusive built environment Part 1: External environment — Code of practice.* British Standards Institution

ICC A117.1-2025 *Standard for Accessible and Usable Buildings and Facilities* as approved by the ICC A117.1 development committee. International Code Council Country Club Hills, Illinois. **Section 505.9**. Note that this section used to be Section 504.6 “Visual contrast”.

ICC A117.1-2025 *Standard for Accessible and Usable Buildings and Facilities* as approved by the ICC A117.1 development committee.International Code Council Country Club Hills, Illinois. **Section 705** Detectable Warning Surfaces and Section 705.3 “Contrast.”

ISO 21542:2021(E) Building construction — *Accessibility and usability of the built environment.* International Standards Organization Geneva, Switzerland

US Department of Transportation. 1994. Detectable Warning Surfaces: Color Contrast and Reflectance. Final Report September 1994. DOT-VNTSC-FTA-94-5. https://accessforblind.org/publications/USDOT/dws-ccr%20(downloaded%20from%20dot%20site).pdf

Cost Impact: Increase

Estimated Immediate Cost Impact:

See the orginal discussion of building cost versus avoided injuries

Estimated Immediate Cost Impact Justification (methodology and variables):

See the orginal discussion of building cost versus avoided injuries

Comment (CAH2)# 691

E78-24

IBC: 1013.6, 1013.6.1, 1013.6.2 (New), FIGURE 1013.6.2 (New), 1013.6.2.1 (New), 1013.6.3 (New), 1013.6.2, 1013.6.3; IFC: [BE] 1013.6, [BE] 1013.6.1, 1013.6.2 (New), FIGURE 1013.6.2 (New), 1013.6.2.1 (New), 1013.6.3 (New), [BE] 1013.6.2, [BE] 1013.6.3

Proposed Change as Submitted

Proponents: Scott Brody, None (sbrody96@gmail.com)

2024 International Building Code

Revise as follows:

1013.6 Externally illuminated exit signs. Externally illuminated exit signs shall comply with Sections 1013.6.1 through ~~1013.6.3~~ 1013.6.5.

1013.6.1 ~~Graphics~~ Exit text. Every textual exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $^{3}/_{4}$ inch (19.1 mm) wide. The word “EXIT” shall have letters having a width not less than 2 inches (51 mm) wide, except the letter “I,” and the minimum spacing between letters shall be not less than $^{3}/_{8}$ inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.The word “EXIT” shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.Exit text shall be permitted to be displayed in multiple languages. In these situations, and in jurisdictions utilizing non-Latin scripts, the size of text, and its placement with respect to directional indicators, shall be *approved*.

Add new text as follows:

1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

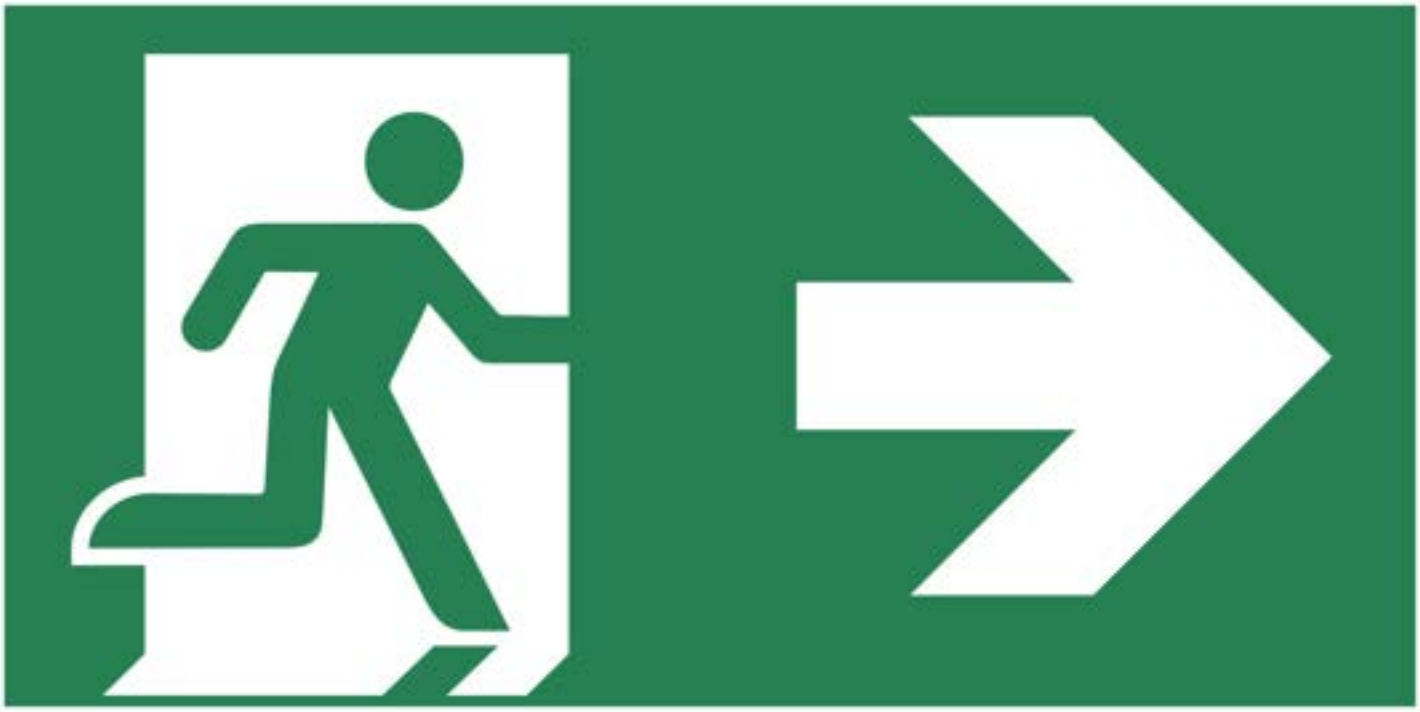


FIGURE 1013.6.2 Graphic exit symbol

1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the graphic symbol or a combination of the text and graphic symbol. Where text and symbol are both provide they shall be displayed simultaneously. The text shall not obstruct the symbol or arrow. The exit text and symbols shall be on one sign or two adjacent signs.

Revise as follows:

~~**1013.6.2**~~ **1013.6.4 Exit sign illumination.** The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

~~**1013.6.3**~~ **1013.6.5 Power source.** Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the *emergency power system* shall be in accordance with Chapter 27. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only. **Exception:** *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

2024 International Fire Code

Revise as follows:

[BE] 1013.6 Externally illuminated exit signs. Externally illuminated exit signs shall comply with Sections 1013.6.1 through ~~1013.6.3~~ 1013.6.5.

[BE] 1013.6.1 ~~Graphics~~ Exit text. Every textual exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $^3/_4$ inch (19.1 mm) wide. The word “EXIT” shall have letters having a width not less than 2 inches (51 mm) wide, except the letter “I,” and the minimum spacing between letters shall be not less than $^3/_8$ inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.The word “EXIT” shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.Exit text shall be permitted to be displayed in multiple languages. In these situations, and in jurisdictions utilizing non-Latin scripts, the size of text, and its placement with respect to directional indicators, shall be *approved*.

Add new text as follows:

1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

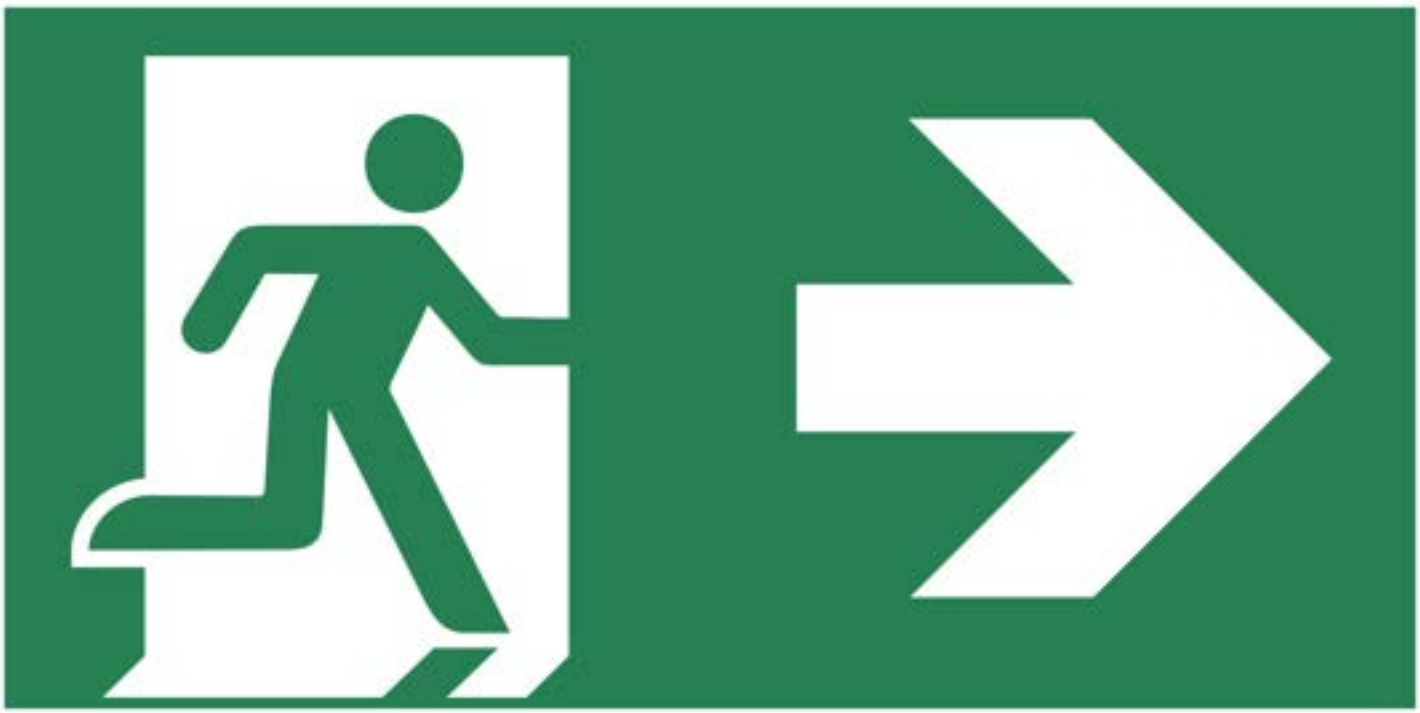


FIGURE 1013.6.2 Graphic exit symbol

1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the graphic symbol or a combination of the text and graphic symbol. Where text and symbol are both provide they shall be displayed simultaneously. The text shall not obstruct the symbol or arrow. The exit text and symbols shall be on one sign or two adjacent signs.

Revise as follows:

[BE] ~~1013.6.2~~ 1013.6.4 Exit sign illumination. The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

[BE] ~~1013.6.3~~ 1013.6.5 Power source. Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 1203. Group I-2, Condition 2 exit sign illumination shall not be provided by unit equipment batteries only. **Exception:** *Approved* exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

Reason: Fixes violations of Code Council Policy #49-21, because the current language:

- Precludes the code from being adopted in certain situations internationally.
- Conflicts with International Law: World Trade Organization Technical Barriers to Trade Agreement Article 2.4

Improves safety because:

o The human brain is better at recalling information when it is presented visually.

o Symbols have faster glance recognition versus words.

o Foreigners, small children, and people with certain disabilities can better understand symbolic communication.

o People in nations using the I-codes will gain exposure to the exit symbol used in most of the world, thus they will be better prepared for emergencies while traveling abroad.

o The ISO arrow is far more legible at a distance vs the tiny chevron directional indicator referenced in the current code.

o Large ISO-type arrows can be more clearly X'd out on dynamic exit signs, which may be coming in the future.

o The proposed language also encourages and incentivizes placing door numbers on signs, which make it easier for emergency services to know what door to arrive at, without the caller having to go outside, look for a door number, and potentially get locked out.

My proposal thus takes advantage of the benefits of symbols, while providing reasonable options for supplemental text to support symbol learning where this type of exit sign has not yet been introduced (mainly the US).

Bibliography: See attachment for bibliography and further justification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

An example of the cost of an exit sign is $20. The total cost for the building is dependent on the number of exit signs required. If you can save even a small amount on each sign, that could be a significant savings for the building.

Estimated Immediate Cost Impact Justification (methodology and variables):

Because this change provides increased flexibility, it is expected costs will be lower in some cases. This is especially true for prefabricated structures, for example jet bridges, which would not have to be imported with separate exit signs for the US market.

For ordinary externally illuminated exit signs, there is potential for cost savings because customers will be able to shop on the global marketplace for ISO signs, vs the smaller market for text signs. This could result in even higher savings in non-English speaking places using this code, because there may be a limited number of manufacturers selling signs in languages with few speakers.

For exit text and symbol signs, the costs would depend on what the AHJ requires. For example, if the AHJ only mandates small exit text, a label could be placed on top of the sign, which could cost in the range of cents more per sign. If the AHJ requires larger text, the sign could wind up larger than the existing standard. Since many sign producers charge based on the surface area of the sign, costs could be expected to be higher than existing norms. However, there would still be 0$ required cost to the builder since they retain the option to continue using text only signs. In the event custom information is added to the sign, such as door numbers, this would be expected to be more expensive than the current sign configuration. It would also generally require larger signs. Since this is only being proposed as an option, it would result in no additional cost if the building owner did not wish to exercise such rights.

Because of the multitude of factors impacting safety, and various conditions in different nations, it is not possible to definitively quantify the safety costs vs benefits of ISO exit signs, vs the current IFC standard.

Since most exit signs are internally illuminated, and these changes apply only to externally illuminated signs, the overall cost impact can be expected to be limited.

Attached Files

- **10382 Exit sign code change narrative without vessels.pdf**
  https://www.cdpaccess.com/proposal/10382/30651/files/download/4773/

E78-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: As written the pictogram is required. This should allow for this the pictogram as an option and/or an exit only sign so that people can get used to this type of exit sign. This is only included under externally illuminated exit signage - what about internally illuminated exit signage. The cost impact indicates this a cost savings, but requiring additional signage would be a cost increase. (Vote: 14-0)

E78-24

Individual Consideration Agenda

Comment 1:

IBC: 1013.6.2, FIGURE 1013.6.2, 1013.6.2.1, 1013.6.3; IFC: 1013.6.2, FIGURE 1013.6.2, 1013.6.2.1, 1013.6.3

Proponents: Scott Brody, Self (sbrody96@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

FIGURE 1013.6.2 ~~GRAPHIC~~ INTERNATIONAL EXIT SYMBOL

1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any

arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the text, the graphic symbol or a combination of the text and graphic symbol. Where a combination of text and symbol is used, the text shall be permitted to be reduced in size. Where text and symbol are both provided, the ~~they shall be displayed simultaneously. The~~ text shall not obstruct the symbol or arrow.
The exit text and symbols shall be on one sign or two adjacent signs.

2024 International Fire Code

[BE] 1013.6.2 Exit symbols. Graphical symbol exit signs shall be based on Figure 1013.6.2 and the symbol shall be a minimum of 5.91 inches (150 mm) high.

[BE] FIGURE 1013.6.2 ~~GRAPHIC~~ INTERNATIONAL EXIT SYMBOL

[BE] 1013.6.2.1 Detail proportions and color requirements. The proportions of the graphic exit symbol, and the size and positioning of any arrow, shall be in accordance with UL 924. The color of the doorway and arrow shall be white. The background and person moving through the doorway shall be green.

[BE] 1013.6.3 Textual and graphic symbol exit signs. Exit signs shall include the text, the graphic symbol or a combination of the text and graphic symbol. Where a combination of text and symbol is used, the text shall be permitted to be reduced in size. Where text and symbol are both provided, the ~~they shall be displayed simultaneously. The~~ text shall not obstruct the symbol or arrow.
The exit text and symbols shall be on one sign or two adjacent signs.

Reason: I intended this proposal to only give the option of using symbol exit signs, not require them. There appears to have been an oversight during post submission processing that may have caused the proposal to read differently.

Externally Illuminated Exit Signs

My latest proposal included within this comment offers the option to use either the word or symbol. Dual symbol text signs should be especially useful for education in places where symbol exit signs are not currently widespread

Pursuant to ICC Code Council Policy CP 49-21, code changes should consider international adoption needs, not just the US.

Internally Illuminated Exit Signs

To reiterate what was stated in my narrative, symbol exit signs are already permitted for internally illuminated signs under the I-codes. Therefore, no changes are proposed regarding internally illuminated signs. To be specific, the I-codes require internally illuminated exit signs conform to ANSI/UL 924. This was updated to include a symbol option in recent years. UL's addition of the symbol option is consistent with requirements that ANSI accredited standards consider relevant international symbol standards, pursuant to WTO trade treaty requirements.

Bibliography: Same sources as origional.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Same as original.

Estimated Immediate Cost Impact Justification (methodology and variables):

Same as original.

Comment (CAH2)# 802

E79-24

IBC: 1014.4, 1014.5; IFC: [BE] 1014.4, [BE] 1014.5

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability. ~~**Exception**~~ **Exceptions:**

1. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.
2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1014.4.2 Type II. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) to not greater than $2\frac{3}{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Revise as follows:

1014.5 Continuity. Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions. **Exceptions:**

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters~~ Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\frac{1}{2}$ inches (38 mm) of the bottom of ~~the~~ Type I *handrails* shall not be considered obstructions. For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension of Type I handrails above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm) shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm). The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.~~
4 ~~5~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

2024 International Fire Code

Revise as follows:

[BE] 1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability. **Exception Exceptions:**

1. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.
2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\,^{1}/_{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\,^{1}/_{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\,^{1}/_{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4.2 Type II. *Handrails* with a perimeter greater than $6\,^{1}/_{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^{3}/_{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $^{5}/_{16}$ inch (8 mm) within $^{7}/_{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^{3}/_{8}$ inch (10 mm) to a level that is not less than $1\,^{3}/_{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\,^{1}/_{4}$ inches (32 mm) to not greater than $2\,^{3}/_{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Revise as follows:

[BE] 1014.5 Continuity. Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions. **Exceptions:**

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters~~ Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\,^{1}/_{2}$ inches (38 mm) of the bottom of ~~the~~ Type I *handrails* shall not be considered obstructions. For each $^{1}/_{2}$ inch (12.7 mm) of additional handrail perimeter dimension of Type I handrails above 4 inches (102 mm), the vertical clearance dimension of $1\,^{1}/_{2}$ inches (38 mm) shall be permitted to be reduced by $^{1}/_{8}$ inch (3.2 mm). The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.~~
4 ~~5~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

Reason: Overview:

This proposal offers changes to both **1014.5 Continuity** and **1014.4 Handrail graspability** to provide a gripping surface at in hallways of Health Care and Nursing Facilities where it is currently not required by the code.

Although handrails are not required the code allows for imposters to be provided at critical locations where they are needed. Crash rails and bumper guards are in fact used as handrails and relied upon by the occupants of hospitals, nursing homes and health care facilities for the functions of guidance and support as defined in the I-Codes. They are common in hallways throughout these facilities where the slope is not steeper than 1:20. These elements are typically larger, more visible and inviting to the occupants that are most frequently in

need of mobility aids. The code offers no provision for a graspable surface but instead, in the absence of such, elicits a deceptive invitation to potential accident by default. These crash rails and bumper guards are typically taller in vertical dimension and larger in perimeter restricting access to the bottom of the rail to attain a grasp. Consequently, the current exception 4 to handrail continuity eliminates any graspable surface by allowing the entire bottom of the rail to be completely obstructed. The option to completely obstruct the bottom of the handrail has been justified as being critical to cost effective installation of the needed crash rails and bumper guards.

Handrail Graspability:

The new exception 2 to handrail graspability is added to ensure that although not required, where handrails are provided along horizontal walking surfaces that are sloped less than 1:20, a functional gripping surface is provided. Although handrails are not required at these locations, they are in fact used as handrails as defined in the I-Codes:

> **Handrail.** A horizontal or slopping rail intended for grasping by the hand for guidance or support.

Exception 2 provides for the use of Type II handrails that have been in the I-Codes for more than 20 years. Type II handrails provide a power span grip surface that is equivalent to 2-inch diameter Type I handrail, been in the I-codes for more than 20 years. Type II handrails have the distinct advantage of a continuous gripping surface that is not interrupted by supports that cause the typical grip and release hand-hopping at each support that is prevalent when trying to maintain continuous contact with the bottom gripping surface critical to the functionality of Type I handrails.

Continuity:

Changes to Exception 3…

Handrails are often supported by elements that may be panels or other objects not best described as brackets or balusters and the substitution of the general term “supports” clarifies the intent of the requirement. Currently exception 3 is worded to address the limitations of small perimeter handrails that require access to the bottom of the handrail to gain a functional grip. This should only apply to Type I handrails that must rely upon grasping the bottom of the handrail. We have inserted specific references to Type I profiles.

Type II handrails are larger in perimeter and have specific recesses designed to provide grip surfaces that need not rely on grasping the bottom of the handrail. They are not dependent upon wrapping the fingers around the bottom surface of the handrail. The new sentence inserted at the end of exception 3 clearly recognizes the unique difference between Type I and Type II handrails. Type II handrails provide an uninterrupted gripping surface not attainable with Type I gripping surfaces that are interrupted by supports attached to the bottom of the handrail.

Changes to Exception 4

Exception 4 has been deleted to assure that where provided the rail that is used as a handrail provides no less than the functionality of a Type II handrail. The design of a Type II gripping surface can easily permit obstruction of the surface below the graspable recesses and allow for the rail to also function as a crash rail or bumper guard that needs to be larger in height and perimeter prohibiting use of a Type I gripping surface as a reasonable or cost-effective solution. However, if desired this proposal does not restrict the use of Type I handrails. This change will provide for the safety of occupants without an increase in the cost of construction. Rail profiles are molded of wood or extruded from other materials. The cost is not affected by the change of profile and will not affect the cost of installation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Handrails shapes are extruded or moulded in a lineal process where the shape does not affect cost other than the difference in material. Less material would be used in an extrusion to create the required recesses of Type II profiles. Wood mouldings would use the same amount of material but remove more when shaped to create the required recesses.

E79-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Since this is a non-required handrail, this should not be an exception under required handrails, and it can be any size or shape - so this section would not apply. This is over reaching when applied to all occupancies. If this is a concern for health care facilities, it should be a requirement limited to those occupancies. (Vote: 14-0)

E79-24

Individual Consideration Agenda

Comment 1:

IBC: 1014.4, 1014.4.1, 1014.4.2, 1014.5; IFC: [BE] 1014.4, [BE] 1014.4.1, [BE] 1014.4.2, [BE] 1014.5

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.
~~**Exceptions**~~ **Exception:**

1. ~~1.~~ In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.
2. ~~2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.~~

1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1014.4.2 Type II gripping surface. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) to not greater than $2\frac{3}{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1014.5 Continuity. Handrail gripping surfaces shall be continuous along their length, without interruption by ~~newel~~ posts or other obstructions along their tops or sides. The bottoms of handrails shall not be obstructed for more than 20 percent of their length within $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrail gripping surface. **Exceptions:**

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.

2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.

3. Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\frac{1}{2}$ inches (38 mm) of the bottom of ~~Type I~~ the *handrails* ~~s~~ shall not be considered obstructions. For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension of ~~Type I~~ the handrail ~~s~~ above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm) shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm). ~~The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.~~

4. Where Type II handrails are provided, the portion of the handrail below the gripping surface specified in Section 1014.4.2 shall be permitted to be obstructed along its entire length.

5. Where crash rails or bumper guards with integral handrails are provided at slopes not steeper than 1:20 a Type II gripping surface shall be permitted.

6 ~~4~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

2024 International Fire Code

[BE] 1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.
~~**Exceptions**~~ **Exception:**

~~1.~~ In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

~~2. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.~~

[BE] 1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4.2 Type II gripping surface
. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) to not greater than $2\frac{3}{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.5 Continuity. Handrail gripping surfaces shall be continuous along their length, without interruption by ~~newel~~ posts or other obstructions along their tops or sides. The bottoms of handrails shall not be obstructed for more than 20 percent of their length within $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrail gripping surface.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.

2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.

3. Supports attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\frac{1}{2}$ inches (38 mm) of the bottom of ~~Type I~~ the *handrail~~s~~* shall not be considered obstructions. For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension of ~~Type I~~ the handrail ~~s~~ above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm) shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm). ~~The entire length of Type II handrails shall be permitted to be obstructed provided any horizontal projection of the supports beyond the sides of the handrail are below the required recess.~~

4. Where Type II handrails are provided, the portion of the handrail below the gripping surface specified in Section 1014.4.2 shall be permitted to be obstructed along its entire length.

5. Where crash rails or bumper guards with integral handrails are provided at slopes not steeper than 1:20 a Type II gripping surface shall be permitted.

6 ~~4~~. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

Reason: This comment is similar to our comment for E82 in that it addresses the issue of handrail graspability and continuity but leaves clearance alone. The clearance at handrail supports remains under continuity. Although this original proposal was disapproved, committee testimony requested us to bring it back if we could restructure the intent without conflict with the "required handrails" called for under 1014.4 Handrail graspability. This comment eliminates exception 2 to 1014.4, as originally proposed, and more appropriately addresses the original intent as an one of obstruction to the gripping surface that is required to be continuous under 1014.5 Continuity and offers new exceptions thereto.

Type I and Type II are each a descriptive of a handrail gripping surface. We have added "gripping surface" to the titles of 1014.4.1 and 1014.4.2. to correlate with the charging statement of 1014.5 (shown below) and aid understanding.

> 1014.5 Continuity. *Handrail* **gripping surfaces** shall be continuous, without interruptions by newel posts or other obstructions.**<emphasis added>**

Language approved in E82 similar to that in A117.1, i.e. <sic> 20% of the length, has been added to clarify obstructions where the bottom of the handrail is a critical element of the gripping surface.

Exception 2 to handrail graspability and the language added to exception #3 of continuity in the original proposal has been deleted and restated as new and unique exceptions 4 and 5 to continuity.

This comment achieves the intent of the proponent to provide reasonable gripping surfaces at crash rails and bumper guards increasing life safety at a sorely needed location. It clarifies the gripping surface requirements of the two types of handrail profiles recognized in the code and provides a better understanding of how they are affected by obstructions.

We will ask to hear this issue following our comment to E82 that actually offers further refinement by addressing issues of obstruction that are better included under clearance than continuity. However this comment stands alone as offering a significant improvement when approved.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Handrails shapes are extruded or moulded in a lineal process where the shape does not affect cost other than the difference in material. Less material would be used in an extrusion to create the required recesses of Type II profiles. Wood mouldings would use the same amount of material but remove more when shaped to create the required recesses.

Comment (CAH2)# 130

E80-24

IBC: 1014.4.1; IFC: [BE] 1014.4.1

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

Revise as follows:

1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and a minimum ~~cross-sectional~~ horizontal widthdimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2024 International Fire Code

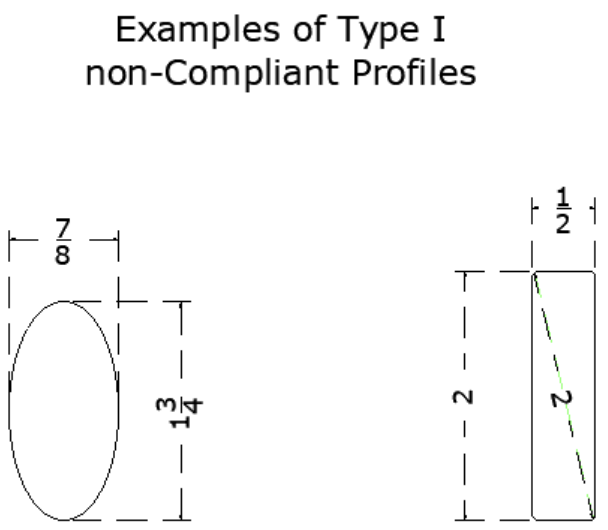
[BE] 1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

Revise as follows:

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and a minimum ~~cross-sectional~~ horizontal width dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Reason: In the 2012 model IBC, section 1012.3.1 Type I. handrails added the new clarifying text of "and minimum cross-sectional dimension of 1-inch (25mm).", to the end of the existing 2 1/4-inch maximum cross-sectional, text. This new minimum cross section dimension of 1-inch was added to specifically to limit the use of thinner Type I handrail profiles being installed in a vertical direction as shown in Sketch RC-02 below.

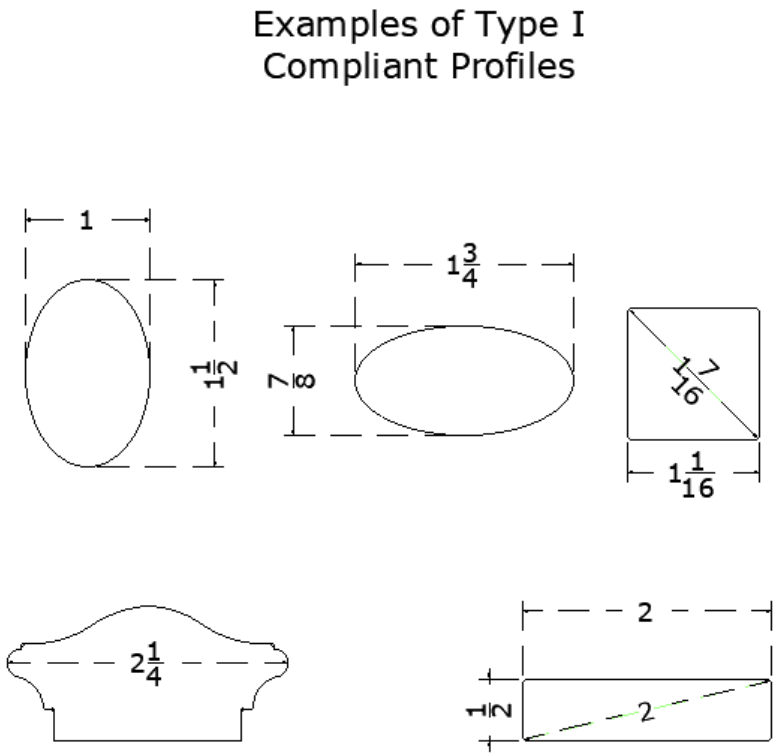


SKETCH RC-02

Of late a limited number of AHJ have been interpreting the minimum limit to be a 2nd dimensional measurement for both horizontal and vertical.

When the author of this proposed modification to clarify the minimum 1-inch dimension was on the hearing floor and testified in favor of E98-09/10, for the addition of the 1-inch minimum width, it was in support to prevent thinner width vertical handrail profiles, from being installed, not to add a 2nd vertical height dimensional requirement, that a limited number of AHJ are now questioning if applies.

Sketch RC-01 shows a group of compliant Type I handrail profiles, of which 2 of the profiles when turned vertical would not comply as depicted in Sketch RC-02 above.



SKETCH RC-01

The proposed deletion of term cross-sectional and replacement with the term horizontal, this author believes eliminates the new arising questions about the minimum and better aligns with what this author believes was the intent of the minimum dimension.

To better explain this point, the following quote is from the original proposal E98-09/10 reason statement.

- "Try doing a chin up or pull up on a 1-1/2" diameter tube versus a 3/8" x 2" steel bar having the 2 inch dimension oriented vertically."

Additionally, since the addition of the new text in the 2012 model IBC, the ICC A117.1 has published the 2017 edition with no addition to the text for a minimum cross-sectional, nor was a proposal submitted for this minimum to be added in the current A117.1 cycle started in 2022.

Bibliography:

- ICC Model 2009 IBC
  - Section 1012.3.1 Type I. Handrails
- ICC Model 2012 IBC
  - Section 1012.3.1 Type I. Handrails
- ICC Model 2024 IBC
  - Section 1014.4.1 Type I. Handrails
- ICC A117.1
  - Section 505.7 Cross section. Handrails
  - Section 505.7.2 Noncircular cross sections.
- 2010 ADA Standard
  - Section 505.7 Cross section. Handrails
  - Section 505.7.2 Noncircular cross sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost impact to the built environment with this code change, as this proposal is cleaning up terminology for required elements of the code for Type I handrails.

E80-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The text provides clarity, but a graphic should be included. This allows for thin horizontal flat rails - this would not be comfortably grasped, so this should also be addressed. See E81-24. (Vote: 14-0).

E80-24

Individual Consideration Agenda

Comment 1:

IBC: 1014.4, 1014.4.1; IFC: [BE] 1014.4, [BE] 1014.4.1

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and a minimum horizontal width ~~dimension~~ of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2024 International Fire Code

[BE] 1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

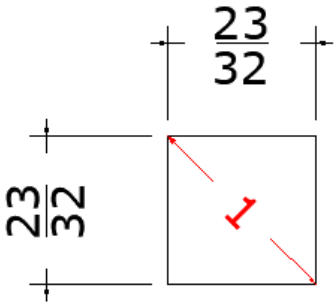
[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and a minimum horizontal width ~~dimension~~ of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Reason: We would ask that you review the original proposal's reason statement in addition to these additional comments.

- During the CAH1 in Florida this past April, committee members suggested that figures of handrail profiles be added into the code. Upon reviewing the large task that would need to be done to include all types of type 1 handrail profiles, we believe these diagrams would be best left for the commentary document and NOMMA would work with ICC staff on these figures for the commentary.
- Additional committee members questioned small edge heights and gripping.
  - "This allows for thin horizontal flat rails - this would not be comfortably grasped, so this should also be addressed."
  - The current wording in the IBC already allows these profiles, however they are normally kicked for bad design. Additionally the IRC, A117.1 & 2010ADA do not address the minimum cross section currently in the IBC and the intent of the proposal was not a rewrite on handrail geometry to restrict a profile, but to clarify that the minimum cross section wording was intended as a width.

    To further explain with a minimum perimeter requirement of 4-inches for type 1 handrails, having a minimum cross section of 1-inch reduces the profile to be under the 4-inch minimum perimeter, as thus, logic tells us the intent was for a minimum width, side to side.

    See figure below showing a 1-inch cross section produces a profile less than 4-inches in perimeter.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement is already within the code, this proposal is editorial for the clarification.

Comment (CAH2)# 751

E81-24

IBC: 1014.4.1; IFC: [BE] 1014.4.1

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) ~~and minimum cross-sectional dimension of 1 inch (25 mm)~~. Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2024 International Fire Code

Revise as follows:

[BE] 1014.4.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) ~~and minimum cross-sectional dimension of 1 inch (25 mm)~~. Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Reason: The current text related to non-circular profiles is being interpreted such that the handrail profile must comply with both the maximum cross-section and minimum cross section regardless of the orientation of the handrail. This was not the intent of the original proposal E98-09/10, included here, as approved for inclusion in the 2012 IBC. The intent was to eliminate the possible use of thin profiles in the vertical orientation.

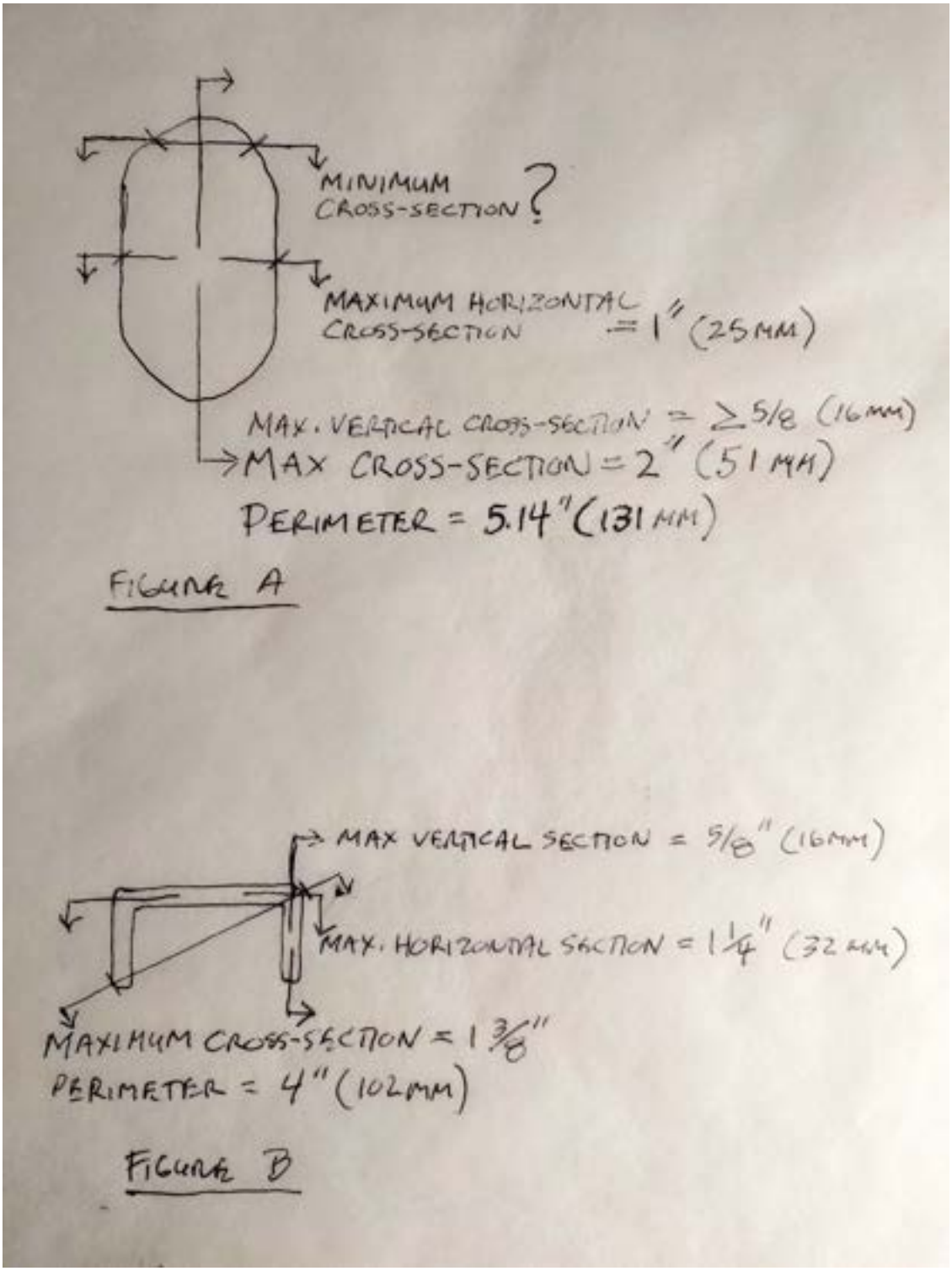
A minimum cross section can be determined at any point in any direction. Consider shapes with large corner radii, ovals, or elliptical sections. Such profiles in both the horizontal and vertical orientation provide suitable access to the bottom of the rail to attain graspability. However, the minimum cross section could be taken at the narrow end of an ellipse or oval as in Figure A. An oval with a 1 inch maximum horizontal cross-section would have a minimum cross-section of far less than an inch at any either end and be reason to reject one of the most graspable non-circular Type I handrail profiles.

Requiring the maximum vertical cross-section to be not less than 5/8 inch restricts thin profiles that would be objectionable when transverse pressure is applied but allows for common channels as in Figure B and traditional metal profiles with long accepted functionality.

The intent of the proponent of E98-09/10 would have been more aptly served had the cross-section language been limited to the horizontal cross-section and a vertical cross-section as proposed here. These dimensions combined with the perimeter range of 4 – 6 ¼ inches and the maximum cross-section provide the necessary controls essential to graspability of Type I non-circular profiles without inhibiting freedom of design.

The 1-inch minimum cross section was never proposed for the IRC where Type II profiles are prominent. Type II rails have the advantage of graspable recesses located to engage the finger and thumb in a power span grip that does not require access to the bottom of the handrail. This is especially important where the handrail typically serves as the top of the guard and is often supported by balusters/guard in-fill, more than just brackets that interrupt the bottom surface. By providing a minimum width for a Type I non-circular profile the supports at the bottom of the handrail may be less objectionable which is a serious issue with any Type one profiles causing hand hoping rather than a continuous grasp.

This change is essential to correct an anomaly in the interpretation of the graspability of non-circular type I handrail profiles.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides additional technical requirements to better regulate the shape of Type I handrails however the added requirements have no material affect upon the cost of construction.

Attached Files

- **E98 - 09-10 Type 1 code change.pdf**
  https://www.cdpaccess.com/proposal/9669/29918/files/download/4115/

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Same reasons as E80-24. (Vote: 14-0)

E81-24

Individual Consideration Agenda

Comment 1:

IBC: 1014.4.1; IFC: [BE] 1014.4.1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shallcomply with all of the following:
~~have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) . Edges shall have a minimum radius of 0.01 inch (0.25 mm).~~

1. A minimum perimeter of 4 inches (102 mm).
2. A maximum perimeter of $6\frac{1}{4}$ inches (160 mm)
3. A maximum cross-section of $2\frac{1}{4}$ inches (57 mm).
4. A minimum width of 1 inch (25 mm)
5. A minimum thickness of $\frac{1}{2}$ inch (13 mm)
6. Edges shall have a minimum radius of .01 inch (0.25 mm)

2024 International Fire Code

[BE] 1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shallcomply with all of the following:
~~have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-~~

~~sectional dimension of $2^{+}/_{4}$ inches (57 mm). The minimum horizontal cross section shall be 1 inch (25 mm) and a the height of the maximum vertical cross-section shall be not less than of 5/8 inch (16 mm) . Edges shall have a minimum radius of 0.01 inch (0.25 mm).~~

1. A minimum perimeter of 4 inches (102 mm).
2. A maximum perimeter of $6^{1}/_{4}$ inches (160 mm)
3. A maximum cross-section of $2^{1}/_{4}$ inches (57 mm).
4. A minimum width of 1 inch (25 mm)
5. A minimum thickness of $^{1}/_{2}$ inch (13 mm)
6. Edges shall have a minimum radius of .01 inch (0.25 mm)

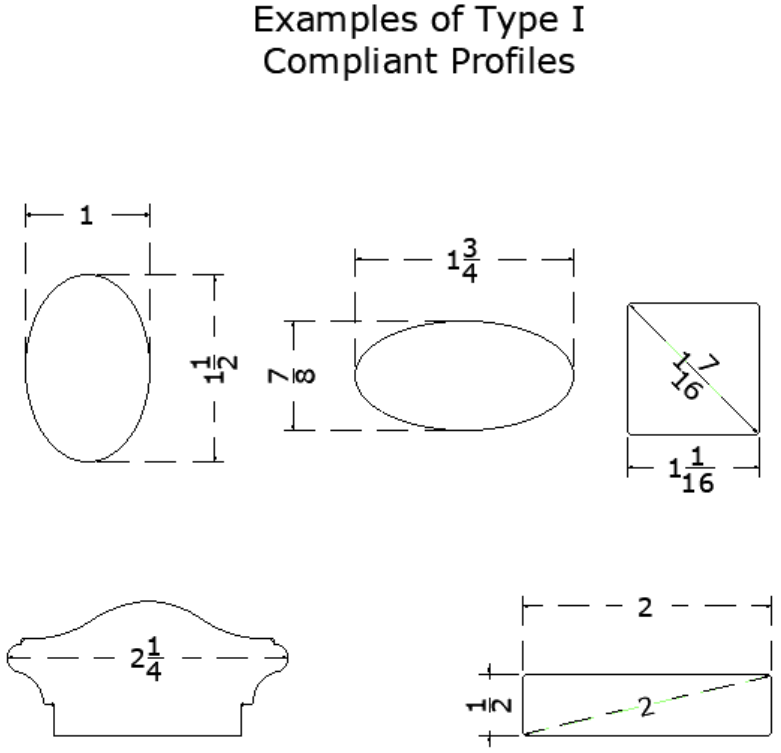
Reason: Collaboration with others from the first hearing as suggested by the Egress committee has resulted in concurrence on this modification. Specifically this eliminates the misunderstood minimum cross-section for non-circular handrail sections replacing it with a minimum width and a minimum thickness of $^{1}/_{2}$ inch rather than the $^{5}/_{8}$ inch originally proposed. To address the question raised as to how to measure the height we have changed the term to thickness which is a more common descriptive used in the trades.

Similar to our comment in E79 Type I and Type II are each a descriptive of the handrail gripping surface referred to in the 1014.5 Continuity. We have added "gripping surface" to the title of 1014.4.1 (shown below) to correlate with the charging statement of 1014.5 and aid understanding.

> 1014.5 Continuity. *Handrail* **gripping surfaces** shall be continuous, without interruptions by newel posts or other obstructions.**<emphasis added>**

Finally we have restructured the requirement to provide a very clear list of the required dimensions that classify the Type I gripping surface dimensions of non-circular handrails as it is much easier to understand than trying to include them in a sentence.

The picture below represents compliant non-circular Type I handrail profiles clearly identified by this comment.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal provides additional technical requirements to better regulate the shape of Type I handrails however the added requirements have no material affect upon the cost of construction.

Comment (CAH2)# 132

E82-24

IBC: 1014.5, 1014.6, 1014.8; IFC: [BE] 1014.5, [BE] 1014.6, BE] 1014.8

Proposed Change as Submitted

Proponents: Thomas Zuzik Jr, RailingCodes.com, National Ornamental & Miscellaneous Metals Association (NOMMA.org) (coderep@railingcodes.com)

2024 International Building Code

Revise as follows:

~~1014.8~~1014.5 **Clearance.** Clear space between a *handrail* and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements. **Exceptions:**

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $^1/_2$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.

~~1014.5~~ 1014.6 **Continuity.** Handrail gripping surfaces shall be continuous~~, without interruption by newel posts or other obstructions.~~ along their length and shall not be obstructed along their tops or sides. Horizontal projections shall occur $1^1/_2$ inches (38 mm) minimum below the bottom of the handrail's gripping surface and the bottoms of required handrails shall not be obstructed for more than 20 percent of their length, within $1^1/_2$ inches (38 mm) below the bottom of the handrail's gripping surface.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1^1/_2$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions.~~ For each $^1/_2$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1^1/_2$ inches (38 mm), on the bottom of handrail gripping surfaces, shall be permitted to be reduced by $^1/_8$ inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards*.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

1014.7 Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of stairs or ramp run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8 . **Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

Revise as follows:

~~1014.6~~ 1014.8 **Fittings.** *Handrails* shall not rotate within their fittings.

2024 International Fire Code

Revise as follows:

[BE] ~~1014.8~~1014.5 **Clearance.** Clear space between a *handrail* and a wall or other surface shall be not less than $1\frac{1}{2}$ inches (38 mm). A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

Exceptions:

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $\frac{1}{2}$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.

[BE] ~~1014.5~~ 1014.6 **Continuity.** Handrail gripping surfaces shall be continuous~~, without interruption by newel posts or other obstructions.~~ along their length and shall not be obstructed along their tops or sides. Horizontal projections shall occur $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrail's gripping surface and the bottoms of required handrails shall not be obstructed for more than 20 percent of their length, within $1\frac{1}{2}$ inches (38 mm) below the bottom of the handrail's gripping surface. **Exceptions:**

1. Within a dwelling unit that is not an Accessible unit or Type A unit, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. ~~Handrail brackets or balusters attached to the bottom surface of the *handrail* that do not project horizontally beyond the sides of the *handrail* within $1\frac{1}{2}$ inches (38 mm) of the bottom of the *handrail* shall not be considered obstructions.~~ For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm),on the bottom of handrail gripping surfaces, shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm).
4. Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

[BE] 1014.7 Handrail extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent *flight* of stairs or *ramp* run. Where handrails are not continuous between *flights*, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of handrails shall be in the same direction of the *flights* of stairs at stairways and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8. **Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

Revise as follows:

[BE] ~~1014.6~~ 1014.8 **Fittings.** *Handrails* shall not rotate within their fittings.

Reason: This code change proposal is first reorganizing the order of some of the handrail Sections to be more in common with the flow of use and enforcement.

- Section 1014.8 Clearance is moved up in order and renumbered to 1014.5.
- Section 1014.6 Fittings is moved down in the order and renumbered to 1014.8. Section
- Section 1014.5 Continuity is moved down one in the order and renumbered to 1014.6.

Next the renumbered Section 1014.6 Continuity, has been revised to better clarify within the code the following requirements.

- The first sentence has been edited to be clearer and align with the text in ICC 2017 A117.1 Section 505.6 gripping surfaces, and also aligns with the clear text within the 2010ADA for obstructions on the top and sides of the handrail profile.
- This code change brings a known requirement currently buried in the text to light and clearly establishes the minimum $1^1/_2$ inch vertical clearance that the code requires between the underside of the handrails gripping surface and any projections to either side of the handrail.
- The new conditional text for the 20% obstruction limit is a long-standing requirement within both the 2010ADA and the ANSI & ICC's A117.1 current and prior additions. As thus, the adding of this conditional text is in line with standard handrail fabrication requirements already being followed for more than a few decades.
    - What the text brings to the IBC is a uniformity between the 2 long-standing standards and the base building code.
- By incorporating the 20% obstruction language into the main text of 1014.6 Continuity, the first sentence in exception 3 can be removed, as it is no longer needed for brackets or balusters.
- The new additional text proposed in the second sentence of exception 3, better clarifies the allowed decrease for both the bracket projections from the sides and the distance for the 20% stipulation.

This code change proposal better aligns the text of the IBC with how handrails are required to be fabricated and installed on projects.

Bibliography:

- ICC model 2024 International Building Code (IBC)
    - Section 1014 Handrails
- ICC 2017 A117.1 Accessible and Usable Buildings and Facilities
    - Section 505 Handrails
- 2010ADA - ADA Standards for Accessible Design (https://ada.gov/)
    - Section 505 Handrails

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

At first glance this proposal may seem like it has a cost affect on construction, however the majority of the proposal is all editorial in nature with clarifications on requirements already within the scope of the code and or required within the ICC's A117.1 standard and the Federal 2010ADA requirements.

E82-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: Moving this text from an exception to the mandatory requirements is appropriate. There was a suggestion to add 'where provided'. (Vote: 9-3)

E82-24

Individual Consideration Agenda

Comment 1:

IBC: 1014.4, 1014.4.1, 1014.4.2, 1014.6, 1014.5, 1014.7, 1014.8; IFC: [BE] 1014.4, [BE] 1014.4.1, [BE] 1014.4.2, [BE] 1014.6, [BE] 1014.5 , [BE] 1014.7, [BE] 1014.8

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1014.4.2 Type II gripping surface. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) to not greater than $2\frac{3}{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

Revise as follows:

~~**1014.6**~~ **1014.5 Continuity.** Handrail gripping surfaces shall be continuous along their length~~ and shall not be obstructed~~ without interruptions by posts or other obstructions along their tops or sides. ~~Horizontal projections shall occur $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrail's gripping surface and the~~ The bottoms of ~~required~~ handrails shall not be obstructed for more than 20 percent of their length, within $1\frac{1}{2}$ inches (38 mm) below the bottom of the handrail's gripping surface.

Exceptions:

1. Within a *dwelling* unit that is not an *Accessible unit* or *Type A unit*, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Supports in accordance with Section 1014.6. ~~For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm),on the bottom of handrail gripping surfaces, shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm).~~
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards.*~~ Where crash rails or bumper guards with integral handrails are provided at slopes not steeper than 1:20 a Type II gripping surface shall be permitted.
5. Where Type II handrails are provided in accordance with Section 1014.6, the portion of the handrail below the gripping surface specified in Section 1014.4.2 shall be permitted to be obstructed along its entire length.

~~5~~ 6. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

~~**1014.5**~~ **1014.6 Clearance.** Clear space between a *handrail* and a wall or other surface shall be not less than $1\frac{1}{2}$ inches (38 mm). Horizontal projections of supports beyond the sides of handrails shall occur $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrails gripping surface. A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements. **Exceptions:**

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $\frac{1}{2}$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.
3. For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm) , the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm) from the bottom of the handrail gripping surface shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm).

1014.7 Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight* of stairs or ramp run. Where *handrails* are not continuous between *flights*, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of *handrails* shall be in the same direction of the *flights* of stairs at stairways and the ramp runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8 . **Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

1014.8 Fittings. *Handrails* shall not rotate within their fittings.

2024 International Fire Code

[BE] 1014.4 Handrail graspability. Required *handrails* shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accesso to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

[BE] 1014.4.1 Type I gripping surface. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). Where the *handrail* is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) with a maximum cross-sectional dimension of $2\frac{1}{4}$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4.2 Type II gripping surface. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) to not greater than $2\frac{3}{4}$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] ~~**1014.6**~~ **1014.5 Continuity.** Handrail gripping surfaces shall be continuous along their length~~ and shall not be obstructed~~ without interruptions by posts or other obstructions along their tops or sides. ~~Horizontal projections shall occur 1 1/2 inches (38 mm) minimum below the bottom of the handrail's gripping surface and the~~ The bottoms of ~~required~~ handrails shall not be obstructed for more than 20 percent of their length, within $1\frac{1}{2}$ inches (38 mm) below the bottom of the handrail's gripping surface. **Exceptions:**

1. Within a dwelling unit that is not an Accessible unit or Type A unit, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a *dwelling unit*, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Supports in accordance with Section 1014.6. ~~For each 1/2 inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of 1 1/2 inches (38 mm),on the bottom of handrail gripping surfaces, shall be permitted to be reduced by 1/8 inch (3.2 mm).~~
4. ~~Where *handrails* are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper *guards.*~~ Where crash rails or bumper guards with integral handrails are provided at slopes not steeper than 1:20 a Type II gripping surface shall be permitted.
5. Where Type II handrails are provided in accordance with Section 1014.6, the portion of the handrail below the gripping surface specified in Section 1014.4.2 shall be permitted to be obstructed along its entire length.

~~5~~ 6. *Handrails* serving stepped *aisles* or ramped *aisles* are permitted to be discontinuous in accordance with Section 1030.16.1.

[BE] ~~**1014.5**~~ **1014.6 Clearance.** Clear space between a *handrail* and a wall or other surface shall be not less than $1\frac{1}{2}$ inches (38 mm). Horizontal projections of supports beyond the sides of handrails shall occur $1\frac{1}{2}$ inches (38 mm) minimum below the bottom of the handrails gripping surface. A *handrail* and a wall or other surface adjacent to the *handrail* shall be free of any sharp or abrasive elements.

Exceptions:

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $\frac{1}{2}$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.
3. For each $\frac{1}{2}$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm) , the vertical clearance dimension of $1\frac{1}{2}$ inches (38 mm) from the bottom of the handrail gripping surface shall be permitted to be reduced by $\frac{1}{8}$ inch (3.2 mm).

[BE] 1014.7 Handrail extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent *flight* of stairs or *ramp* run. Where handrails are not continuous between *flights*, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At *ramps* where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of handrails shall be in the same direction of the *flights* of stairs at stairways and the *ramp* runs at *ramps* and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8. **Exceptions:**

1. *Handrails* within a *dwelling unit* that is not required to be accessible need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between *flights* or to extend beyond the top or bottom risers.

[BE] 1014.8 Fittings. *Handrails* shall not rotate within their fittings.

Reason: The original proposal was approved because it moves what should be a requirement from the exception however it moves it to the wrong location. In thorough review of this proposal it seemed that issues of clearance at handrails and handrail continuity are still confused. Currently requirements for clearance are stated under both Continuity and Clearance. This modification meets the intent of the original proposal but moves the requirement describing "vertical clearance" where it should be into Clearance, newly located as 1014.6. This puts all the clearance requirements in one section and clarifies the Continuity section which need simply state the requirement for a continuous handrail.This comment is similar to our comment for E79 in that it addresses the issue of handrail graspability and continuity but also includes clearance. Although this original proposal was approved, we have restructured the requirements for clearance, continuity and graspabilty and hope E79 will be heard following this comment. this comment more appropriately addresses the original intent as an one of obstruction to the gripping surface that is required to be continuous under 1014.5 Continuity and offers new exceptions thereto.

Type I and Type II are each a descriptive of a handrail gripping surface. We have added "gripping surface" to the titles of 1014.4.1 and 1014.4.2. to correlate with the charging statement of 1014.5 (shown below) and aid understanding.

> 1014.5 Continuity. *Handrail* **gripping surfaces** shall be continuous, without interruptions by newel posts or other obstructions.**<emphasis added>**

The language similar to that in A117.1, i.e. <sic> 20% of the length..., approved in CAH1 remains and clarifies obstructions allowed where the bottom of the handrail is a critical element of the gripping surface.

Exception 3 to continuity now simply needs to reference clearance. Exception 4 is revised as in E79 to clarify that a Type II gripping surface can be provided rather than the current exception that allows no gripping surface at all.

Exception 5 recognizes that a Type II gripping surface has graspable recesses and that obstructions below the gripping surface that comply with 1014.6 Clearance are not restricted.

This comment achieves the intent of the proponent to provide reasonable gripping surfaces at crash rails and bumper guards increasing life safety at a sorely needed location. It clarifies the gripping surface requirements of the two types of handrail profiles recognized in the code and provides a better understanding of how they are affected by obstructions. Finally it gathers all the handrail clearance requirements and exceptions in one section titled clearance.
This comment offers a complete and thorough restructuring that will significantly improve consistent interpretation and enforcement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

At first glance this proposal may seem like it has a cost affect on construction, however the majority of the proposal is all editorial in nature with clarifications on requirements already within the scope of the code and or required within the ICC's A117.1 standard and the Federal 2010ADA requirements.

Comment (CAH2)# 64

E86-24

IBC: 1014.10; IFC: [BE] 1014.10

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1014.10 Intermediate handrails. *Stairways* with a required width of greater than 60 inches, shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

Revise as follows:

[BE] 1014.10 Intermediate handrails. *Stairways* with a required width of greater than 60 inches, shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

Reason: The intermediate handrail requirement can be inadvertently read to require an intermediate handrail every 5', or to require a center handrail with a center door. This is a clarification for where they would be required. This is not a technical change.

Where there is sufficient distance for occupants to navigate to the sides of a monumental stairway the most direct path of egress, the centerline of the door to the exit, may not be the natural path.

This modification gives guidance to the building official to allow intermediate handrails to be installed in the correct locations.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification for the requirements for a central handrail on wider stairways.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: While some of the committee felt that this was a clarification, where the handrail overlaps the required stairway

width, the stairway can be wider than 60" and a person could still be within 30" of a handrail. The confusion is a misinterpretation of the difference between provided stairway width and required stairway width. See also E87-24. (Vote: 9-5)

E86-24

Individual Consideration Agenda

Comment 1:

IBC: 1014.10; IFC: [BE] 1014.10

Proponents: Shane Nilles, Self (snilles@awc.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1014.10 Intermediate handrails. *Stairways* with a required width of greater than ~~60~~ 88inches~~,~~ shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

[BE] 1014.10 Intermediate handrails. *Stairways* with a required width of greater than ~~60~~88 inches~~,~~ shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental *stairs*, where intermediate handrails are required, *handrails* shall be located along the most direct path of egress travel.

Reason: The original proposal obstructs the usable width of a stairway by reducing the width by which a stairway would be required to be provided with an intermediate handrail. Because the current code relies on the distance to the handrail as the location that all portions of the required egress width must be within 30" of, and the allowance for a handrail to project up to 4.5" into the stair, the current code could have a stair with a required egress width up to 69" wide without an intermediate handrail. The proposal reduces that by making the required width of the stair the trigger with no consideration for handrail projection, meaning that the trigger for an intermediate handrail would be reduced by 9". This is a technical change and therefore the original proposal was mischaracterized as being a clarification only.

The unintended benefit of the proposal is that it highlighted the issue with the current code as written. Because of the effective current code requirement to provide an intermediate handrail at 70" of required stair width, the stair is obstructed by the handrail in a manner that actually makes the actual occupant capacity of the stair reduced as opposed to a 69" wide stair. A handrail is supposed to enhance the safety of a stair, not reduce the time of egress for the occupants, so this issue with the current code should be addressed.

The proposed revision per this comment addresses both the original proponent's intent of clarifying when the 1st intermediate handrail is required, as well as fixes the unintended hazard by not requiring the intermediate handrail until the required egress width exceeds 88 inches. The provided figures illustrate the issues with the original proposal, the current code, and the appropriate solution provided by this comment:

Figure 1. Shows the minimum current code width of a stair, and the resulting minimum width between handrails. This illustrates how the original proposal would result in the usable widths of the stair serving 305 occupants (Figure 2) to be less than what is required for a stair serving <50 occupants. It also shows that this comment meets the usable widths of a stair serving 440 occupants (Figure 3) as what is provided for a stair serving 50>220 occupants.

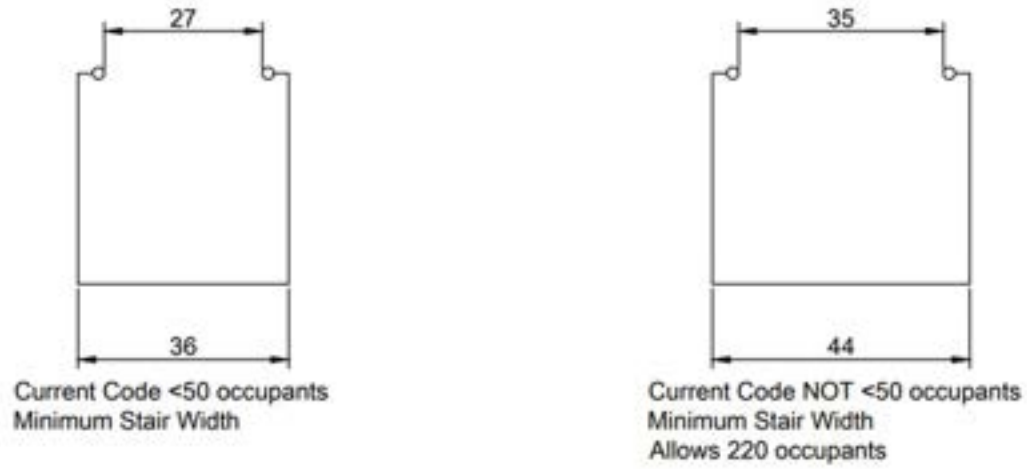


Figure 2. Shows a) the width of stair requiring an intermediate handrail per the original proposal, b) the width of stair requiring an intermediate handrail per the current code, and c) the ability to have 3 occupants within the width of a stair not requiring an intermediate handrail per the current code, that would be prohibited by the original proposal as it would require the handrail thereby obstructing the middle of the stair.

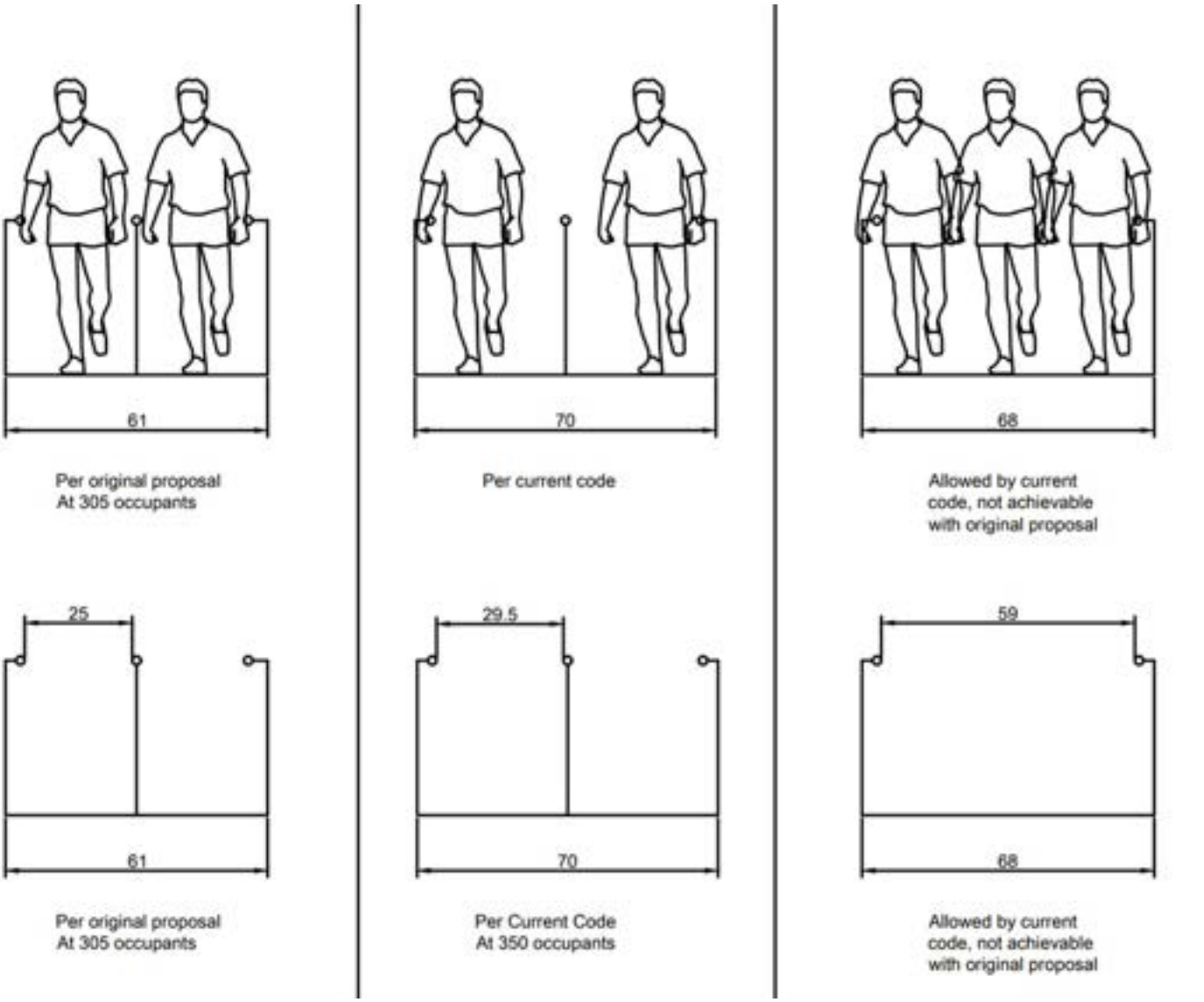
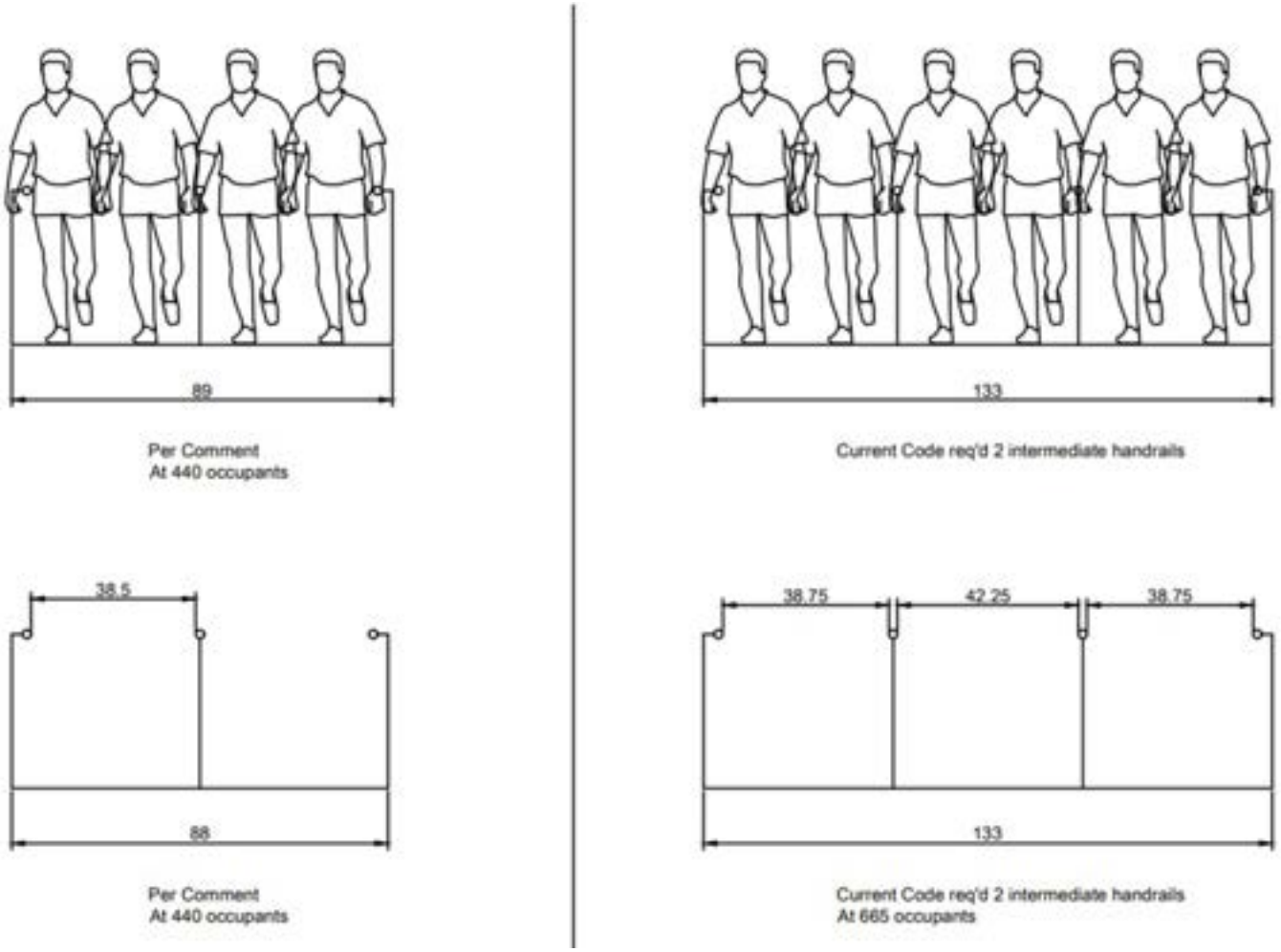


Figure 3. Shows a) the width of a stair requiring an intermediate handrail per this comment and the ability to have 2 occupants use the stair on both sides of the intermediate handrail and b) the width of a stair requiring two intermediate handrails per the current code to

illustrate that this comment properly aligns with how the code intends to require intermediate handrails at widths still providing the ability to have 2 occupants on all sides of the intermediate handrail(s).



Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - Decrease in cost of construction

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposed comment will allow for a wider stairway before requiring an intermediate handrail. This will allow for savings by eliminating the cost to fabricate/install the intermediate handrail for stairs with a required egress width between 69" and 88".

Comment (CAH2)# 485

Comment 2:

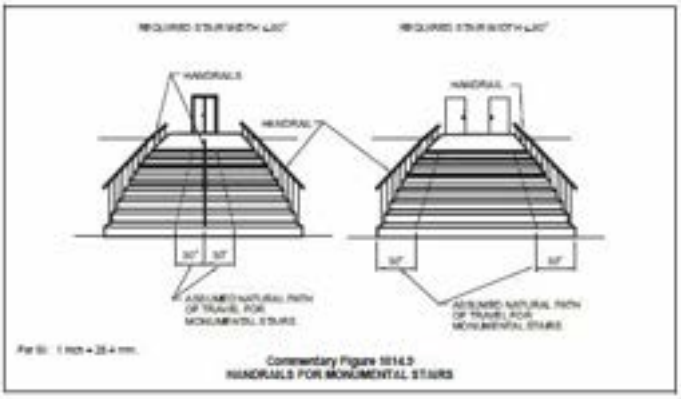
Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Submitted

Reason: We believe this proposal was disapproved based on incorrect testimony. Examples were given stating a center handrail was not required until 69", but that is assuming handrail projections. Other proponents thought a center handrail was required on a 44 inch wide stairway. This misunderstanding is why this change is needed.

The proposal uses the required width of 60 inches as the starting point for this requirement. Handrails do not have to project into the required width of the stairway - it is an option (Section 1014.3). If you had handrails that did protrude 4-1/2" and a double center handrail (Se3ction 1014.9), the required width could be wider than 60" and meet the required reach to a handrail of 30". Below are the relevant sections and a picture from the IBC commentary illustrating Section 1014.9.

1014.3 Lateral location. Handrails **located outward from the edge of the walking surface** of flights of stairways, ramps, stepped aisles and ramped aisles shall be located 6 inches (152.4 mm) or less measured horizontally from the edge of the walking surface. Handrails projecting into the width of the walking surface shall comply with Section 1014.9.

1014.9 Projections. On ramps and on ramped aisles that are part of an accessible route, the clear width between handrails shall be36 inches (914 mm) minimum. **Projections into the required width** of aisles, stairways and ramps at each side shall not exceed 41/2inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum head-room height required in Section 1011.3. **Projections due to intermediate handrails** shall not constitute a reduction in the egress width. Where a pair of intermediate handrails are provided within the stairway width without a walking surface between the pair of intermediate handrails and the distance between the pair of intermediate handrails is greater than 6inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of handrails that is greater than 6 inches (152 mm).



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 222

E87-24

IBC: 1014.10; IFC: [BE] 1014.10

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1014.10 Intermediate handrails. *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. Where intermediate *handrails* are required on ~~On monumental~~ *stairs* in excess of the required width or required capacity, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

Revise as follows:

[BE] 1014.10 Intermediate handrails. *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*.Where intermediate *handrails* are required on ~~On monumental~~ *stairs*in excess of the required width or required capacity, *handrails* shall be located along the most direct path of egress travel.

Reason: What is a monumental stair? Ask different people and the answers will be varied. “Monumental stair” is not a defined term and interpretation is inconsistent. A search of the IBC shows that **1014.9** is the only place where the term “monumental stairs” is used so it would seem that a better description of the intent of the requirement would be more reasonable than adding a definition for a term that is used in a solitary requirement.

The intent of this requirement is to provide for handrails that are within the reach of the users on wider stairs. The intent of the second sentence of this requirement is to assure that functional intermediate handrails are provided for stairways that are designed with an aesthetic of exaggerated width in proportion to the required width /egress capacity.

Eliminating the vague and often misunderstood term of “Monumental” and inserting text to describe the condition will allow for consistent interpretation and enforcement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The substitution language replaces a misunderstood term that lacks clear definition without technical change to the intent of the code. The change is of no consequence to the methods or cost of construction.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The term monumental stairways is commonly understood. The proponent should review the submitted modification and work with the proponents of E86-24. (Vote: 13-1)

E87-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202 (New), 1014.10; IFC: SECTION 202 (New), [BE] 1014.10

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Add new definition as follows:

MONUMENTAL STAIRWAY . A stairway that exceeds the minimum required width and capacity such that at least one intermediate handrail is required.

1014.10 Intermediate handrails. *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental stairways ~~Where intermediate *handrails* are required on *stairs in excess of the required width or required capacity*~~, *handrails* shall be located along the most direct path of egress travel.

2024 International Fire Code

Add new definition as follows:

[BE] MONUMENTAL STAIRWAY . A stairway that exceeds the minimum required width and capacity such that at least one intermediate handrail is required.

[BE] 1014.10 Intermediate handrails. *Stairways* shall have intermediate *handrails* located in such a manner that all portions of the *stairway* minimum width or required capacity are within 30 inches (762 mm) of a *handrail*. On monumental stairways ~~Where intermediate *handrails* are required on *stairs in excess of the required width or required capacity*~~, *handrails* shall be located along the most direct path of egress travel.

Reason: Based upon the committee's action and the confusing testimony it seems prudent to offer a definition though the original proposal sought not to do so. This comment allows the current code text to remain for those who know one when they see one. For those who do not know when they see one, i.e. most users of the code other than code officials, a definition has been provided for a term that is obscure at best and used only once in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The substitution language replaces a misunderstood term that lacks clear definition without technical change to the intent of the code.

The change is of no consequence to the methods or cost of construction.

Comment (CAH2)# 176

E89-24

IBC: 1015.2; IFC: [BE] 1015.2

Proposed Change as Submitted

Proponents: John Grenier, National Council of Structural Engineers' Associations (NCSEA) (jgrenier@greniereng.com)

2024 International Building Code

Revise as follows:

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~and~~ at the perimeter of occupiable roofs, and at walking surfaces near retaining walls in accordance with Section 1807.2.5. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

2024 International Fire Code

Revise as follows:

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, ~~and~~ at the perimeter of *occupiable roofs*, and at walking surfaces near retaining walls in accordance with Section 1807.2.5 of the International Building Code. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.

5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Reason: 1. To clarify that walls and retaining walls associated with a building or a site, also require Guards to protect against falls.

2. Section **1807.2.5 Guards** was added to the 2024 IBC via code change proposal S157-22. The proposed new language in Section 1015.2 will be a pointer to that section.

3. The 2021 IBC Commentary states "Where one or more sides of a walking surface are open to the floor level or grade below, a guard system must be provided to minimize the possibility of occupants accidentally falling to the surface below". The pointer to section 1807.2.5 is important to eliminate potential confusion and possible misunderstanding that walls and retaining walls are not governed by the IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement for guards at retaining walls is in Section 1807.2.5, so this is just pointing to that guard requirement.

E89-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee (AMC1)**

Committee Modification:
2024 International Building Code

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, at the perimeter of occupiable roofs, and at ~~walking surfaces near~~ retaining walls in accordance with Section 1807.2.5. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.

5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

2024 International Fire Code

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, at the perimeter of *occupiable roofs*, and at ~~walking surfaces near~~ retaining walls in accordance with Section 1807.2.5 of the International Building Code. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.

Committee Reason: The modification removed subjective language. The requirement should be in the guards section, not in Section 1807.2.5, however, until this gets relocated, the proposal added a necessary pointer for guards on retaining walls. (Vote: 12-2)

E89-24

Individual Consideration Agenda

Comment 1:

IBC: 1015.2, 1807.2.5, 1807.2.5.1, 1807.2.5.2, 1807.2.5.3; IFC: [BE] 1015.2

Proponents: John Grenier, National Council of Structural Engineers' Associations (NCSEA), NCSEA (jgrenier@greniereng.com)

requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side, and at the perimeter of occupiable roofs~~, and at retaining walls in accordance with Section 1807.2.5~~. Guards shall be located at retaining walls having an upper grade level that is more than 30 inches (762 mm) measured vertically above the lower grade level at any point within 36 inches (914 mm) horizontally from the exposed face of wall, and is open to unanticipated pedestrian access that would have the possibility of a fall to the lower level such as a walking surface, parking area, playground, yard, planter, or similar use areas. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.
11. At retaining walls in locations that cannot be accessed by the public as determined by the building code official.

1807.2.5 Guards. *Guards* shall be provided at retaining walls in accordance with Section 1015.2 ~~Sections 1807.2.5.1 through 1807.2.5.3.~~ ~~**Exception:** *Guards* are not required at retaining walls not accessible to the public.~~

Delete without substitution:

~~**1807.2.5.1 Where required.** At retaining walls located within 36 inches (914mm) of walking surfaces, a *guard* shall be required between the walking surface and the open side of the retaining wall where the walking surface is located more than 30 inches (762 mm) measured vertically to the surface or grade below at any point within 36 inches (914mm) horizontally to the edge of the open side. *Guards* shall comply with Section 1607.9.~~

~~**1807.2.5.2 Height.** Required *guards* at retaining walls shall comply with the height requirements of Section 1015.3.~~

~~**1807.2.5.3 Opening limitations.** Required *guards* shall comply with the opening limitations of Section 1015.4.~~

2024 International Fire Code

[BE] 1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade

below at any point within 36 inches (914 mm) horizontally to the edge of the open side, and at the perimeter of occupiable roofs~~, and at retaining walls in accordance with Section 1807.2.5 of the International Building Code~~. Guards shall be located at retaining walls having an upper grade level that is more than 30 inches (762 mm) measured vertically above the lower grade level at any point within 36 inches (914 mm) horizontally from the exposed face of wall, and is open to unanticipated pedestrian access that would have the possibility of a fall to the lower level such as a walking surface, parking area, playground, yard, planter, or similar use areas. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9 of the International Building Code.

Exception: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including *stairs* leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, *ramps* and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an *occupiable roof* where an *approved* barrier is provided.
11. At retaining walls in locations that cannot be accessed by the public as determined by the building code official.

Reason: This comment is being submitted at the recommendation of ICC Staff and based on the comments in the Committee Reason Statement: "The requirement should be in the guards section, not in Section 1807.2.5, however, until this gets relocated, the proposal added a necessary pointer for guards on retaining walls."

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement for guards at retaining walls is in Section 1807.2.5, so this change is just pointing to that guard requirement.

Comment (CAH2)# 705

E91-24

IBC: 1015.3; IFC: [BE] 1015.3

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

2024 International Building Code

Revise as follows:

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three *stories* above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings* .
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the l *nosings* .
5. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard transition at the top of a flight is permitted to be less than the required guard height for a distance over the landing not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

~~5~~ 6. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~6~~ 7. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

~~7~~ 8. In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

2024 International Fire Code

Revise as follows:

[BE] 1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

[BE] 1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the *guard*.

Exceptions:

1. For occupancies in Group R-3 not more than three *stories* above grade in height and within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.
3. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings* .
4. For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the l *nosings* .

5. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard transition at the top of a flight is permitted to be less than the required guard height for a distance over the landing not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

~~5~~ 6. The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

~~6~~ 7. Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

~~7~~ 8. In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

Reason: In the residencies cited in the new exception the required handrail/stair guard height is 34 – 38 inches. The handrail/stair guard often intersects an adjacent landing guard at the top of a flight. The guard at an open sided landing measured from the walking surface of the landing has a minimum height of 36 inches but has no maximum. Typically guards at a landing may be at a height of as much as 42 inches. The typical difference in height between handrail and level guard is 4 -8 inches directly over the top riser. At this point the handrail must be 34-38".

However, the floor surface at the nosing of the landing, from which guard height is determined, extends as much as 1 1/4 inches beyond the top riser. The resulting landing guard is typically 4 - 8 inches higher than the handrail that is required to be continuous to a point directly over the top riser. This presents a conflict in determining whether the guard height or the handrail height is to be accommodated at this intersection of handrail and guard. This can especially problematic when the occupant has children and requests the handrail be positioned as low as possible.

In most situations a continuous transition is preferred to achieve integrity of the design for safety, structural and aesthetic concerns. However, the strictest interpretation of the code only provides for a more vertical transition from as low as 34 inches to 42 inches to achieve both handrail and guard height requirements. Although an exception to handrail height allows for a handrail fitting to exceed the required handrail height it is often better to allow the handrail height to remain constant and afford an inconsequential reduction of the required guard height for a short distance.

Some might apply the opening limitation requirements when interpreting this situation however, this is not always the case. This proposal will allow for consistent interpretation of a smooth transition of the handrail/guard of the stair with the guard at an open sided landing and extension of the handrail at constant height. The horizontal dimension of 12 inches provides the necessary distance to configure an extension of the handrail without undue compromise of the guard's function to minimize the possibility of a fall to the floor or grade below. See figures 1 & 2.

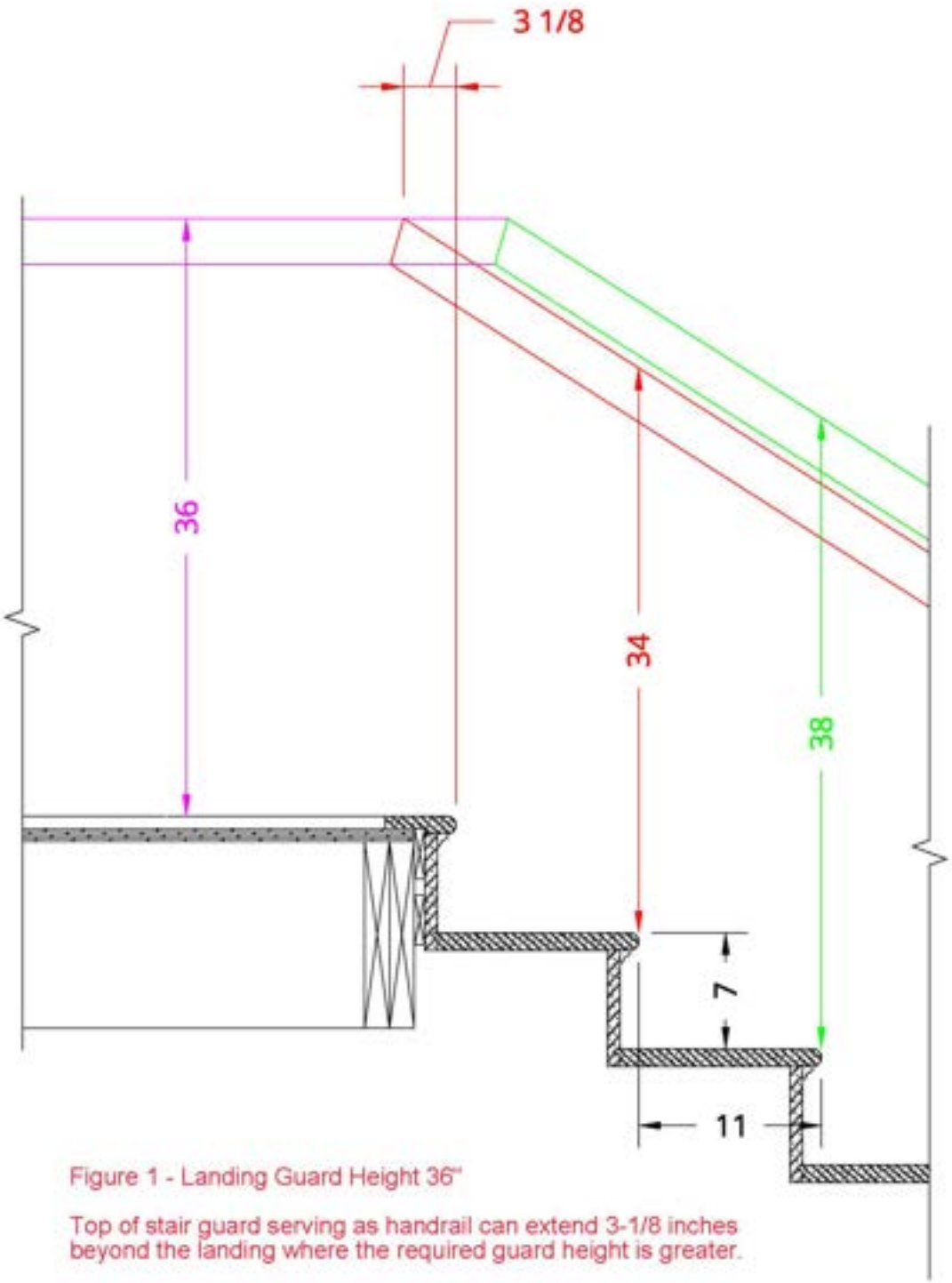


Figure 1 - Landing Guard Height 36"

Top of stair guard serving as handrail can extend 3-1/8 inches beyond the landing where the required guard height is greater.

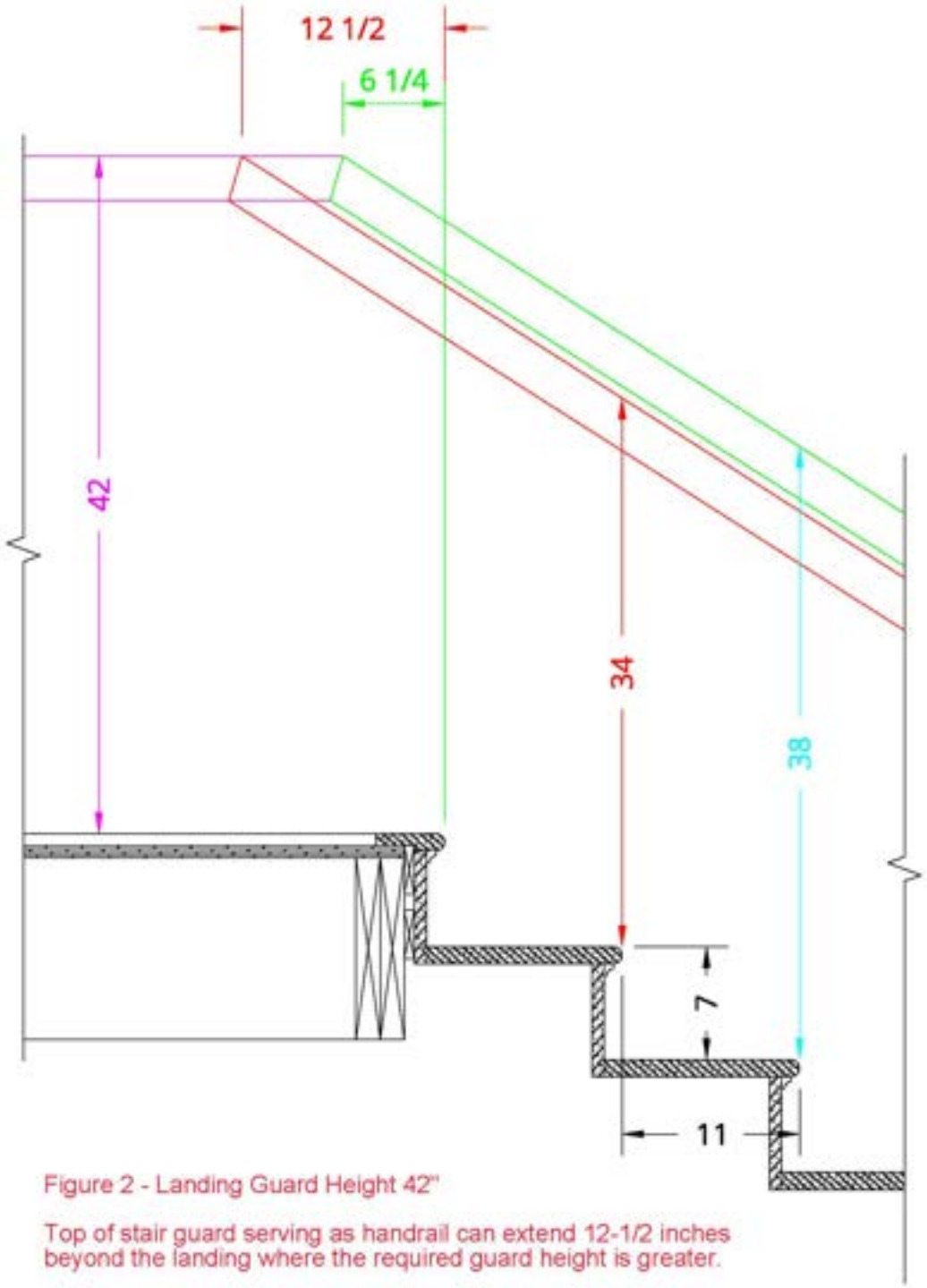


Figure 2 - Landing Guard Height 42"

Top of stair guard serving as handrail can extend 12-1/2 inches beyond the landing where the required guard height is greater.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The technical changes only provide for an alternate location of the related elements. There is no change in the material or labor required that has any consequence upon the cost of construction.

E91-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This is a run on sentence that needs to be edited. (Vote: 14-0)

E91-24

Individual Consideration Agenda

Comment 1:

IBC: 1015.3; IFC: [BE] 1015.3

Proponents: David Cooper, Stairbuilders and Manufacturers Association, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 and within individual *dwelling units* in occupancies in Group R-2, the required height of *guards* is permitted to be reduced in accordance with the following:

   1.1. ~~For occupancies in Group R-3~~ Where not more than three *stories* above grade in height and ~~within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height~~ with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.

   1.2. ~~For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where~~ Where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.

   1.3. ~~For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards*~~ *Guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.

   1.4. ~~For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where~~ Where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the *nosings*.

   1.5. ~~For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard~~ At the transition of the handrail to the guard at the top of a flight, ~~is permitted to be less than~~ the required guard height ~~for a distance over the landing~~ shall not be less than the handrail height for a distance not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

2. ~~6.~~ The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

3. ~~7.~~ Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

4. ~~8.~~ In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

2024 International Fire Code

Revise as follows:

[BE] 1015.3 Height. Required *guards* shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On *stairways* and stepped *aisles*, from the line connecting the *nosings*.
3. On *ramps* and ramped *aisles*, from the *ramp* surface at the *guard*.

Exceptions:

1. For occupancies in Group R-3 and within individual *dwelling units* in occupancies in Group R-2, the required height of *guards* is permitted to be reduced in accordance with the following:

   1.1. ~~For occupancies in Group R-3~~ Where not more than three *stories* above grade in height and ~~within individual *dwelling units* in occupancies in Group R-2 not more than three *stories* above grade in height~~ with separate *means of egress*, required *guards* shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.

   1.2. ~~For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual *dwelling units*, where~~ Where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required *guards* shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.

   1.3. ~~For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, *guards*~~ *Guards* on the open sides of *stairs* shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.

   1.4. ~~For occupancies in Group R-3, and within individual *dwelling units* in occupancies in Group R-2, where~~ Where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the *nosings*.

   1.5. ~~For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard on the open side of stairs serves as a handrail, the height of the guard~~ At the transition of the handrail to the guard at the top of a flight, ~~is permitted to be less than~~ the required guard height ~~for a distance over the landing~~ shall not be less than the handrail height for a distance not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

2. ~~6.~~ The *guard* height in assembly seating areas shall comply with Section 1030.17 as applicable.

3. ~~7.~~ Along *alternating tread devices* and ships ladders, *guards* where the top rail serves as a *handrail* shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.

4. ~~8.~~ In Group F occupancies where *exit access stairways* serve fewer than three *stories* and such *stairways* are not open to the public, and where the top of the *guard* also serves as a *handrail*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

Reason: For the most part the original text was defeated as being lengthy and verbose but most testimony agreed with the reason/need for the change. This comment provides the terse, cohesive language the committee and the majority of opposition testimony had suggested was necessary. The proposed list format grouping of all the residential guard height exceptions further aids understanding. Other CAH1 testimony was opposed because they misinterpreted the drawings submitted and the 12 inch dimension as illustrating handrail extensions.. That is not the case as the illustrations only represent certain residential applications where the top of the stair guard is permitted to serve as the handrail and be at the lower height of handrails. Please see the photos and renderings as labeled below that more clearly identify the intent of this comment and the original proposal.

This is a needed change for two critical reasons:

1. Most consumers feel it advantageous to have the handrail at the lower end of the required height range, especially in homes with children and older persons unable to maintain erect posture or with shrinking stature that is inherent with aging.
2. The code measures stair guard and handrail height from a line connecting the nosings however guards at landings and floors are measured from the walking surface. Handrails must be continuous to a point directly above the riser however the landing extends beyond the riser as much as $1\,^{1}/_{4}$ inches. Currently the stair guard would have to be the exact same height as the level guard to have a "sharp" and precise transition or a considerably higher stair guard to allow for a smooth transition by an over easing or a

wreathed fitting, i.e. curved stair handrails. (A wreathed handrail "twists" to conform to the angle of incidence of the users grip as they ambulate through the raked turn of the stair).

The ability to make a smooth rounded transition from stair guard to the level guard at the landing allows a safe and continuous grasp of the handrail. This proposal offers a superior alternative to the use of a gooseneck (vertical type transition) or post at the transition from the stair guard/handrail (allowed in the code) providing a greater level of safety. The minimal decrease from the required landing guard height is only allowed at the top of a flight and occurs for a negligible distance. This type of transition has been common throughout the built environment for hundreds of years. Please review the photographic examples below of common transitions.

Figure 1

Handrail to Post as permitted by code

Gooseneck from Handrail to Post as permitted by code

Gooseneck from Handrail to Guard as permitted by code

Figure 2

Simple Bisect of Handrail and Guard at Exactly Same Height
The arrow indicates area addressed by new exception

Figure 3

Wreathed transitions from Handrail to Landing Guard that provide continuous grip without interruption but require the proposed exception to the required landing guard height.

Figure 4

Preferred smooth transition of Handrail to landing Guard using over-easing at the top of a flight provides for continuous grip without interruption. Red dimension arrow indicates maximum 12 Inch distance where guard height exception would apply.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The technical changes only provide for an alternate location of the related elements. There is no change in the material or labor required that has any consequence upon the cost of construction.

Comment (CAH2)# 83

E93-24

IBC: TABLE 1017.2; IFC: [BE] TABLE 1017.2

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

1017.2 Limitations. *Exit access* travel distance shall not exceed the values given in Table 1017.2.

Revise as follows:

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)	
	NS	S, S13R	S13D
A, E, F-1, M, ~~R,~~ S-1	200[e]	250[b]	NP
R-1	NP	250	NP
R-2, R-3[c], R-4[c]	NP	250	200
I-1	~~Not Permitted~~ NP	250[b]	NP
B	200	300[e]	NP
F-2, S-2, U	300	400[e]	NP
H-1	~~Not Permitted~~ NP	75[b~~d~~]	NP
H-2	~~Not Permitted~~ NP	100[b~~d~~]	NP
H-3	~~Not Permitted~~ NP	150[b~~d~~]	NP
H-4	~~Not Permitted~~ NP	175[b~~d~~]	NP
H-5	~~Not Permitted~~ NP	200[e]	NP
I-2, I-3	~~Not Permitted~~ NP	200[e]	NP
I-4	150	200[e]	NP

For SI: 1 foot = 304.8 mm. NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8: For the distance limitation in malls.

Section 407.4: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1: For the distance limitations in Group I-3.

Section 411.2: For the distance limitation in special amusement areas.

Section 412.6: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1017.2.3: For increased distance limitation in Group H-5.

Section 1030.7: For increased limitation in assembly seating.

Section 3103.4: For temporary structures.

Section 3104.9: For pedestrian walkways.

~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

b. ~~d~~ Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

c. ~~Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~ The exit access travel distance shall only apply in a Group R-3 and R-4 occupancy located in a mixed occupancy building.

2024 International Fire Code

[BE] 1017.2 Limitations. *Exit access* travel distance shall not exceed the values given in Table 1017.2.

Revise as follows:

[BE] TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)	
	NS	S, S13R	S13D
A, E, F-1, M, ~~R,~~ S-1	200	250[b, c]	NP
R-1	NP	250	NP
R-2, R-3[c], R-4[c]	NP	250	200
I-1	~~Not Permitted~~ NP	250[b]	NP
B	200	300[c]	NP
F-2, S-2, U	300	400[c]	NP
H-1	~~Not Permitted~~ NP	75[bd]	NP
H-2	~~Not Permitted~~ NP	100[bd]	NP
H-3	~~Not Permitted~~ NP	150[bd]	NP
H-4	~~Not Permitted~~ NP	175[bd]	NP
H-5	~~Not Permitted~~ NP	200[c]	NP

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)	
	NS	S, S13R	S13D
I-2, I-3	~~Not Permitted~~ NP	200[e]	NP
I-4	150	200[e]	NP

For SI: 1 foot = 304.8 mm. NP = Not Permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Sections 903.2.8 and 903.3.1.3.

a. See the following sections for modifications to exit access travel distance requirements:

Section 402.8 of the International Building Code: For the distance limitation in malls.

Section 407.4 of the International Building Code: For the distance limitation in Group I-2.

Sections 408.6.1 and 408.8.1 of the International Building Code: For the distance limitations in Group I-3.

Section 411.2 of the International Building Code: For the distance limitation in special amusement areas.

Section 412.6 of the International Building Code: For the distance limitations in aircraft manufacturing facilities.

Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.

Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.

Section 1006.3.4: For buildings with one exit.

Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.

Section 1017.2.3: For increased distance limitation in Group H-5.

Section 1030.7: For increased limitation in assembly seating.

Section 3103.4 of the International Building Code: For temporary structures.

Section 3104.9 of the International Building Code: For pedestrian walkways.

~~b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.~~

~~c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.~~

b ~~d~~. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

~~e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.~~

c. The exit access travel distance shall only apply in a Group R-3 and R-4 occupancy located in a mixed occupancy building.

Reason: The intent of this group of proposal is to make the tables in Chapter8 and 10 consistent with the revisions to Table 504.3, 504.4, 506.2 – using S13, S13R, S13D and NP for sprinkler requirements. This would clarify what happens when an NFPA 13D sprinkler system is used. This is not intent to change current allowances; just to clarify what requirements are applicable for an NFPA13D system. Discussion during the BCAC calls has indicated that it is needed to identifying specific code sections so that everyone has the same understanding.

Group R-4 requirements do not always have to be stated as Section 310.5 states “Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.” However, since a lot of people miss that, we are including R-4 in the proposed applicable footnotes.

Townhouses are defined as attached dwelling units that extend from foundation to grade and are open on at least two sides. If a townhouse is 3 stories or less, it can choose to comply with the IBC or IRC (Section 101.2). The IRC Section P2904 is similar to an NFPA 13D system. If the IBC is used, townhouses subdivided by firewalls into 1 or 2 units per building is a Group R-3 (Section 310.4) and townhouses subdivided by fire partitions (Section 420.2) are a Group R-2 (Section 310.3). This is important to clarify because all townhouses can use a 13D sprinkler system: Section 903.2.8 references 903.3, and 903.1.3.3 specifically stating that “Automatic sprinkler systems installed in … and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.” To make this obvious in the tables, a reference to 903.2.8 and 903.1.3.3 are added in the footnote.

Specifics for this change –

- adds the S13, S13R, S13D and NS in the table titles and footnotes with the section references for sprinklers.
- add columns for NFPA13D and rows to separate out Group R requirements.
- Footnotes b, c and e are redundant and deleted.
- The new footnote is added to coordinate with the singe exit allowance in Section 1006.3.4 Item 4.
- “NP” instead of “not permitted” is for consistency in table styles.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of requirements for Group R where an NFPA13D system is permitted. There are no changes to construction requirements.

E93-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal needs to clarify that Group R-2 townhouses are limited to 3 stories when using a NFPA13D system - this might be in the new footnote. It needs to be clarified where Group R-3 and R-4 are allowed to not have a limit on the exit access travel distance. Section 1006.2.2.6 this appears to reduce the travel distance to 125' for Group R-3 and 75' for Group R-4. (Vote:12-2)

E93-24

Individual Consideration Agenda

Comment 1:

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Submitted

Reason: BCAC had 5 different proposals dealing with requirements for buildings where an NFPA13D sprinkler system is permitted. Proposal FS94-24, E16-24 and E95-24 were approved. We are asking for approval of code changes E22-24 and E93-24 for consistency within the code.

In these tables, by not listing an NFPA13D system, there is no information on exit access travel distance for buildings where an NFPA13D system is permitted. Non-sprinklered buildings say 'NP' for 'not permitted', so information is missing.

Much of the discussion with the committee was about where an NFPA13D system can be used. That is outside the scope of these proposals. However, Code change F100-24 was approved as modified to clarify where an NFPA13D system can be use. This is the approved text.

2024 International Fire/Building Code
Revise as follows:
903.2.8 Group R. An automatic sprinkler system installed in accordance with Section 903.3.1 shall be provided throughout all buildings with a Group R fire area.
Delete without substitution:
~~903.2.8.1 Group R-3. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.~~
~~903.2.8.2 Group R-4, Condition 1. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4, Condition 1 occupancies.~~
~~903.2.8.3 Care facilities. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.~~
Revise as follows:
903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one- and two-family dwellings and townhouses; Group R-3; and Group R-4~~, Condition 1; and townhouses~~ shall be permitted to be installed throughout in accordance with NFPA13D.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 141

E96-24

IBC: TABLE 1020.2; IFC: [BE] TABLE 1020.2

Proposed Change as Submitted

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com)

2024 International Building Code

Revise as follows:

TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
E	All	1	1
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, ~~E,~~ F, M, S, U	Greater than 30	1	0
E	All	1	1
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

Reason: This proposal is intended add a requirement for a 1 hr fire-resistance rating on corridor walls in sprinkled E Occupancies. It emulates an amendment which was made when the City of Chicago adopted the International Building Code.

The City of Chicago suffered a tragic loss of ninety-two students and three nuns during the Our Lady of the Angels School Fire on December 1, 1958. Many of these lives were lost due to flames and smoke blocking their normal means of egress. No doubt this fire and the tragic loss of life was on the minds of the City Council members when amending their code. And it should be on our minds when considering this proposal. There is no more important a responsibility we as a collective group should have here this week than to protect the lives of our children and grandchildren through requirements for safe building construction methods.

The need for rated corridors was removed for the sprinkled occupancies during the transition from the legacy codes to the International Building Code. Since that time, if I have heard it once, I have heard it one hundred times, “We need to reinstate the requirement for rated corridors in our schools.” So here is our opportunity.

When voting on this proposal, please keep in mind the chaotic environment which would exist in a school fire. Even though the students and facility do practice fire drills, an actual fire is far different. The practiced means of egress may not be available due to fire, smoke and toxic gases. So having the redundancy of sprinklers and fire-resistance-rated construction certainly increases the likely-hood of a safe ending to a school fire. Please vote to reinstate the requirement for protecting corridors in sprinkled E occupancies. Do it for the children!

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The average additional installed cost of constructing a 1 hr fire-resistance-rated gypsum board wall as compared to a non-rated gypsum board wall is approximately $1 to $2 / sq ft. The average additional installed cost of constructing a 1 hr fire-resistance-rated concrete masonry unit (CMU) wall as compared to a non-rated CMU wall is approximately $2 to $4 / sq ft. In addition to the additional cost of construction the wall, the various breaches will need to be likewise protected in accordance with Sections 714, 715, 716 and 717 of the International Building Code. Below is the average cost for installing this additional protection:

1. Based on industry and manufacturer input, the average cost of an installed firestop system is $50 to $60 per penetration.
2. Based on industry and manufacturer input, the average cost of an installed joint system is $25 to $40 per lineal foot.
3. Based on industry and manufacturer input, the average increase in cost of an installed 20 minute without hose stream door versus a non-rated door is $50 to $100 per door.
4. Based on industry and manufacturer input, the average increase in cost of an installed 20 or 45 minute fire-protection glazing versus a non-rated glazing is $25 to $40 per sq ft of opening.
5. Based on industry and manufacturer input, the average cost of an installed fire, smoke or combination fire/smoke damper is $300 to $500, $1,000 to $1,500 and $1,000 to $1,500 per damper, respectively.

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost includes average materials and labor costs for the above items. The cost range includes protecting both sides of wall assembly where appropriate. In the end, the exact increase in cost is based on the specific building design in question.

E96-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. The school fire in 1958 is not an appropriate reference for school buildings as they are built today - schools are constructed with passive and active fire protection systems. Children have monthly fire drills their entire life, so they are well trained in school evacuation. There have been no fire deaths in a school since 1958. There is no recent fire data provided for this significant change in cost for schools - this is not an incremental cost as indicated in the cost impact statement. Closers on classrooms doors are a problem for younger children to open on their own - so fire rated doors will be propped open by the teacher. (Vote: 14-0)

E96-24

Individual Consideration Agenda

Comment 1:

IBC: TABLE 1020.2; IFC: [BE] TABLE 1020.2

Proponents: Richard Walke, Creative Technology Inc., SAFTIFIRST (richwalke61@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, F, M, S, U	Greater than 30	1	0
E	All	1	~~1~~0.5
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

2024 International Fire Code

[BE] TABLE 1020.2 CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B, F, M, S, U	Greater than 30	1	0
E	All	1	~~1~~0.5
R	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1, I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.

b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

Reason: The need for rated corridors was removed for the sprinklered E occupancies during the transition from the legacy codes to the International Building Code. Since that time, if I have heard it once, I have heard it one hundred times, “We need to reinstate the requirement for rated corridors in our schools.” So here is our opportunity.

The proposal as originally written proposed a change in the fire-resistance rating from 0 hr to 1 hr on corridors in sprinklered E occupancies. This was intended to emulates an amendment which was made when the City of Chicago adopted the International Building Code. The original proposal is being modified based on input received from multiple sources both during and after Committee Action Hearing #1.

The modification to the original proposal is to change the required fire resistance rating for sprinklered E occupancies from 1 hr to 0.5 hr. The 0.5 hr rating for sprinklered applications is consistent with other sections or tables of the IBC including the R occupancies within the corridor Table 1020.2 and dwelling and sleeping unit separations covered by Section 708.3.

The landscape of school safety has changed dramatically over the last several decades. Arson fires now account for 43 percent of the school fires. The arson fire could be set by a student simply wanting to get out of a test that day to a mass shooter with using fire to carry out violence against the students and teachers as they evacuate the classrooms due to the fire. And there certainly could be multiple ignition locations.

The Report of Committee Action Hearing #1 mentions there has not been a fire death in a school since 1958. That statement contradicts published information from NFPA Research.[1] The referenced report sites the following statistics relating to school fires during the five-year period from 2014 through 2018:

- The fire services responded to an average of 3,230 school fires per year.
- School fires caused an average of 1 civilian death per year, 39 civilian injuries per year and $37 million in direct property damage per year.
- Arson is the leading cause of school fires, representing 43% of the fires.
- Arson fires accounted 60% of the civilian injuries and 54% of the direct property damage.
- Arson fires were more prevalent in high schools and middle schools than elementary schools.
- 65% of school fires were during school hours, 8a – 4p.
- School fires most often originate in the lavatories and locker rooms.

During Committee Action Hearing #1, testimony cited a growing threat from arson fires targeting violence against persons. Testimony stated the number of fires of this type increased by 57% from 2019 and 2020 in cities having a population of at least 1,000,000 persons and 11% in cities having a population under 10,000 persons.[2] These statistics are particularly frightening for large cities.

Testimony at Committee Action Hearing #1 also questioned why we require rated corridors in sprinklered I-1, I-3 and R occupancies but

not E occupancies. While I recognize the different risk levels of these occupancies as compared to E occupancies, I also recognize the need to protect our vulnerable children. There is no more important a responsibility we as a collective group should have here this week than to protect the lives of our children and grandchildren through requirements for safe building construction methods in our schools. Having the redundancy of sprinklers and fire-resistance-rated construction certainly increases the likely-hood of a safe ending to a school fire. Please vote to reinstate the requirement for protecting corridors in sprinklered E occupancies. Do it for the children!

Bibliography: [1] NFPA Research, September, 2020 - Structure Fires in Schools, by Richard Campbel
[2] Cybersecurity & Infrastructure Security Agency - Fire as a Weapon

Cost Impact: Increase

Estimated Immediate Cost Impact:

The average additional installed cost of constructing a 1/2 hr fire-resistance-rated gypsum board wall as compared to a non-rated gypsum board wall is approximately $1 to 2 / sq ft. The average additional installed cost of constructing a 1/2 hr fire-resistance-rated concrete masonry unit (CMU) wall as compared to a non-rated CMU wall is approximately $2 to 4 / sq ft. In addition to the additional cost of construction the wall, the various breaches will need to be likewise protected in accordance with Sections 714, 715, 716 and 717 of the International Building Code. Below is the average cost for installing this additional protection:

1. Based on industry and manufacturer input, the average cost of an installed firestop system is $50 to $60 per penetration.
2. Based on industry and manufacturer input, the average cost of an installed joint system is $25 to $40 per lineal foot.
3. Based on industry and manufacturer input, the average increase in cost of an installed 20 minute without hose stream door versus a non-rated door is $200 to $300 per door, including the cost of the necessary hardware.
4. Based on industry and manufacturer input, the average increase in cost of an installed 20-minute fire-protection glazing versus a non rated glazing is $25 to $40 per sq ft of opening.
5. Based on industry and manufacturer input, the average cost of an installed fire, smoke or combination fire/smoke damper is $300 to $500, $1,000 to $1,500 and $1,000 to $1,500 per damper, respectively.

Estimated Immediate Cost Impact Justification (methodology and variables):

This includes average materials and labor costs for the above items. The cost range includes protecting both wall assemblies of the corridor, where appropriate. In the end, the exact increase in cost is based on the specific building design in question.

Comment (CAH2)# 470

E97-24

IBC: SECTION 202 (New), SECTION 202, 1022.1, 1022.3 (New), 1023.3.1, 1022.3.2 (New), 1022.3.2.1 (New), 1022.3.2.2 (New), 1022.3.2.3 (New), 1008.3, 1024.5; IFC: SECTION 202 (New), SECTION 202, [BE] 1022.1, 1022.3 (New), [BE] 1023.3.1, 1022.3.2 (New), 1022.3.2.1 (New), 1022.3.2.2 (New), 1022.3.2.3 (New), [BE] 1008.3, [BE] 1024.5

Proposed Change as Submitted

Proponents: Jenifer Gilliland, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (jenifer.gilliland@seattle.gov); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Angela Haupt, City of Kirkland, Washington Association of Building Officials, Technical Code Development Committee (ashaupt@kirklandwa.gov)

2024 International Building Code

Add new definition as follows:

EXIT PATHWAY.
An exit component that serves to meet one or more means of egress design requirements and is open to sky.

Revise as follows:

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways* and *ramps* and *horizontal exits*.

1022.1 General. *Exits* shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of *exit* protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge.* ~~Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*~~.

Add new text as follows:

1022.3 Exit continuity. Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps*.

Revise as follows:

~~**1023.3.1**~~ **1022.3.1 Extension.** Where an *exit passageway* is used to provide continuity of an *exit*, ~~*interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*,~~ the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.

3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4.

Add new text as follows:

1022.3.2 Exit pathways. *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section 1022.3.2.1 through 1022.3.2.3.

1022.3.2.1 Construction and openings. The floor, walls, and openings of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*.

1022.3.2.2 Location. The *exit pathway* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *exit pathway*, to:

1. The closest interior *lot line*.
2. The centerline of a street, an alley, or *public way*.
3. An imaginary line between two *buildings* on the lot.

1022.3.2.3 Path marking. *Exit pathways* shall be delineated or marked to clearly indicate the path of travel.

Revise as follows:

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3 *Exit pathways*
   ~~2.3.~~ 2.4. Exit passageways.
   ~~2.4.~~ 2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   ~~2.5.~~ 2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
    3.1. Electrical equipment rooms.
    3.2. *Fire command centers*.
    3.3. Fire pump rooms.
    3.4. Generator rooms.
    3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

1024.5 Openings. Exit passageway opening protectives shall be in accordance with the requirements of Section 716. Except as permitted in Section 402.8.7, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section ~~1023.3.1~~1022.3.1.

Elevators shall not open into an *exit passageway*.

2024 International Fire Code

Add new definition as follows:

EXIT PATHWAY. An exit component that serves to meet one or more means of egress design requirements and is open to sky.

Revise as follows:

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exit pathways, *exterior exit stairways* and *ramps* and *horizontal exits*.

[BE] 1022.1 General. *Exits* shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*. ~~*Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge*.~~

Add new text as follows:

1022.3 Exit continuity. Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps*.

Revise as follows:

[BE] ~~1023.3.1~~ 1022.3.1 Extension. Where an *exit passageway* is used to provide continuity of an *exit*, ~~*interior exit stairways* and *ramps* are extended to an *exit discharge* or a *public way* by an *exit passageway*,~~ the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 of the International Building Code or a *horizontal assembly* constructed in accordance with Section 711 of the International Building Code, or both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 of the International Building Code shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited. **Exceptions:**

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.

2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4 of the International Building Code.

Add new text as follows:

1022.3.2 Exit pathways. *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section 1022.3.2.1 through 1022.3.2.3.

1022.3.2.1 Construction and openings. The floor, walls, and openings of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*.

1022.3.2.2 Location. The exit pathway shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the exit pathway, to:

1. The closest interior lot line.
2. The centerline of a street, an alley, or public way.
3. An imaginary line between two buildings on the lot.

1022.3.2.3 Path marking. *Exit pathways* shall be delineated or marked to clearly indicate the path of travel.

Revise as follows:

[BE] 1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3 Exit pathways
   ~~2.3.~~ 2.4. Exit passageways.
   ~~2.4.~~ 2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   ~~2.5.~~ 2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

[BE] 1024.5 Openings. *Exit passageway* opening protectives shall be in accordance with the requirements of Section 716 of the International Building Code.
Except as permitted in Section 402.8.7 of the International Building Code, openings in *exit passageways* other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section ~~1023.3.1~~1022.3.1.

Elevators shall not open into an *exit passageway*.

Reason: The design of new buildings on small complex sites with steep or varying grades can result in buildings with multiple levels and entrances, towers of differing heights, parking garages that are partially underground with large roof decks near grade, etc. Complying with *means of egress* requirements can be difficult and some applicants propose using outdoor spaces such as roofs or roof decks as part of an *exit* or to connect *exit* components. There is no obvious code path allowing a surface like a roof or deck that is open to sky to be used to connect exit components without requiring it to be enclosed with an *exit passageway*, which is cost prohibitive.

Proposed Solution: Exit Pathway

This proposal combines *exit* continuity language from other Chapter 10 locations into Section 1022 Exits and adds new sections and definitions to establish a new option for connecting *exit* components, the *exit pathway.* The *exit pathway* has two attributes: it must be open to sky and is an *exit* component. An *exit pathway* is a delineated route that crosses a space that is open to sky and connects *exit* components, in a similar manner to how an *exit passageway* connects two *interior exit stairways* within a building (see Figure 1 below).

The purpose of the changes in each section is as follows:

1022.1 General. The last sentence, "*Exits* shall be continuous from the point of entry into the *exit* to the *exit discharge,*" is being relocated to section 1022.3 to create a new section, Exit continuity.

1022.3 Exit continuity. This section addresses two important aspects of an *exit*: they must be continuous from beginning to end and an exit can be a combination of several different *exit* components, including the new *exit pathway*.

This proposal also adds *exterior exit stairways and ramps* to the list of exit components that can be daisy-chained together to form the egress path to the exit discharge or public way. Using Figure 1 as an example, if the delineated *exit pathway* crosses the podium of a podium building, in many designs, an *exterior exit stairway* (minus the stair penthouse shown in the figure) is used to get from the podium level to the public way. The language in the current code (1023.3, Exception) would not allow this, yet the level of safety of an *exterior exit stairway* is presumed to be the same as the other *exit* components.

1022.3.1 Extension. The *exit passageway* extension requirement used to separate the *interior or exterior exit stairway and ramp* from the *exit passageway* is being relocated from Section 102**3**.3.1 into Section 102**2**.3.1. *Exit* continuity needs to be maintained through all components of an *exit*, not just *interior exit stairways* and ramps, so the relocation to Section 1022, the general exiting section, is more appropriate.

1022.3.2 *Exit pathways*: Adds scoping language for the new *exit pathway section.*

1022.3.2.1 Construction and openings: The floors and walls of the *exit pathway* would be protected like an *exit passageway,* but there

would be no ceiling that needs protection. The exit pathway is protected from fires below by requiring the horizontal assembly required in 1024.3 to extend 10 feet from the edge of the pathway. Where there is a minimum of 10 feet of horizontal separation between the edge of the *exit pathway* and other parts of the building, then no walls would be required. However, where *building* walls are less than 10 feet from the edge of *exit pathway*, they must be protected for a vertical distance of 10 feet (see Figure 2 below).

1022.3.2.2 Location: The hazard of adjacent buildings is mitigated with a requirement to have 10 feet of *fire separation distance* between the edge of the *exit pathway* and the lot line, centerline of the right-of-way, or an imaginary lot line, which is similar to how Section 1027.5 protects exterior stairs.

1022.3.2.3 Path marking: Marking the *exit pathway* is required. It can be disorienting to leave an exit stairway or other area and suddenly find yourself in an open to sky area that isn't at grade. Providing a visual cue for the *exit pathway* will allow people to get to the other exit component efficiently in the event of an emergency.

1008.3 Illumination required by an emergency electrical system: To coordinate with the change requiring illumination made in 1002.3.2.4, *exit pathways* is added as item 2.3, requiring the emergency electrical system to automatically illuminate the pathway if there is a power failure. Ambient lighting is not an effective substitute for artificial lighting especially in dense urban environments. Areas like podium plazas, may get little ambient light because of shadows from neighboring buildings and the top floor of many high-rise buildings are stepped back and of a such height that no other building is nearby that can provide the ambient light necessary to light the *exit pathway*. In recognition of the limitations of ambient lighting, the code hasn't relied on the use of ambient lighting to light the exit discharge since the 2018 IBC.

1024.5 Openings: The reference to 102**3**.3.1 is being changed to 102**2**.3.1 to reflect the relocation of the extension section for *exit passageway*s in 1023 to 1022.3.1. See comments on 1022.3.1.

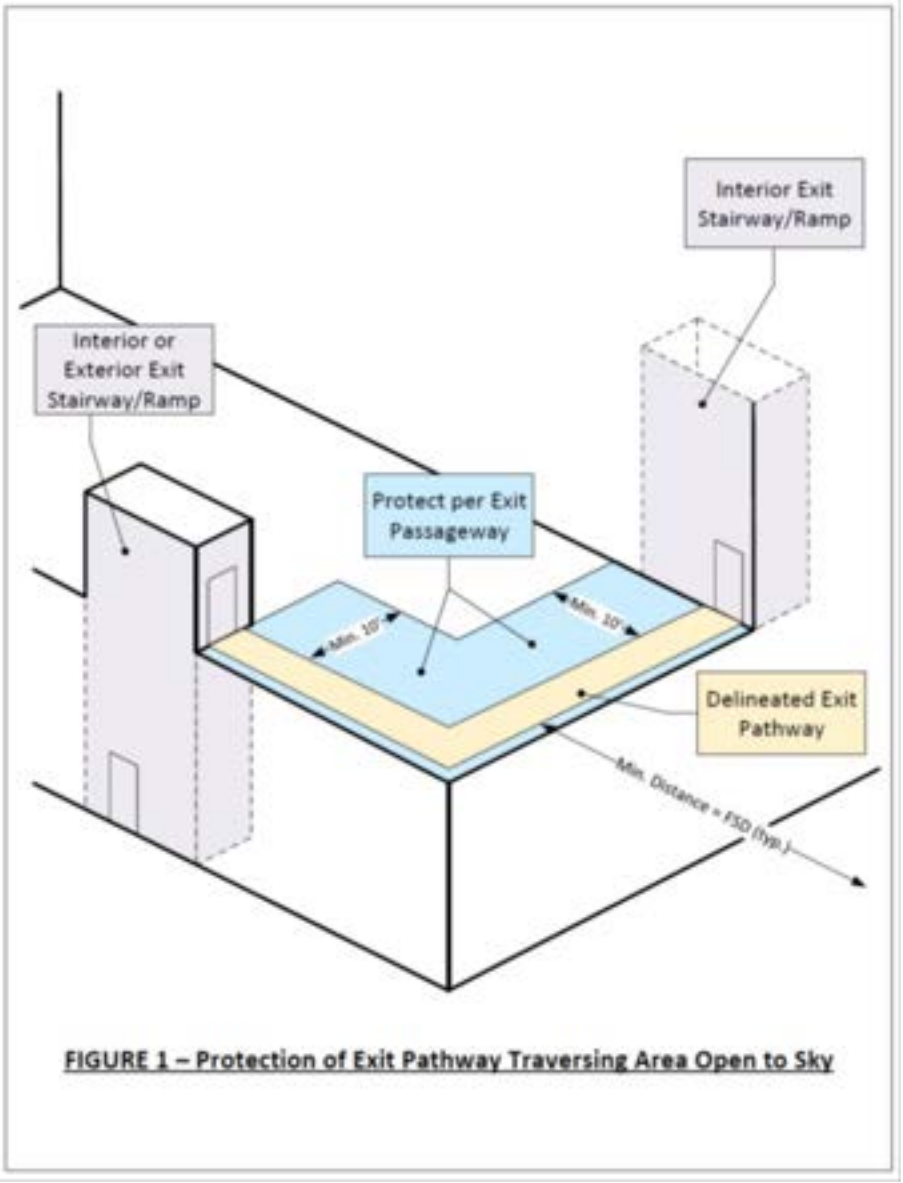


FIGURE 1 – Protection of Exit Pathway Traversing Area Open to Sky

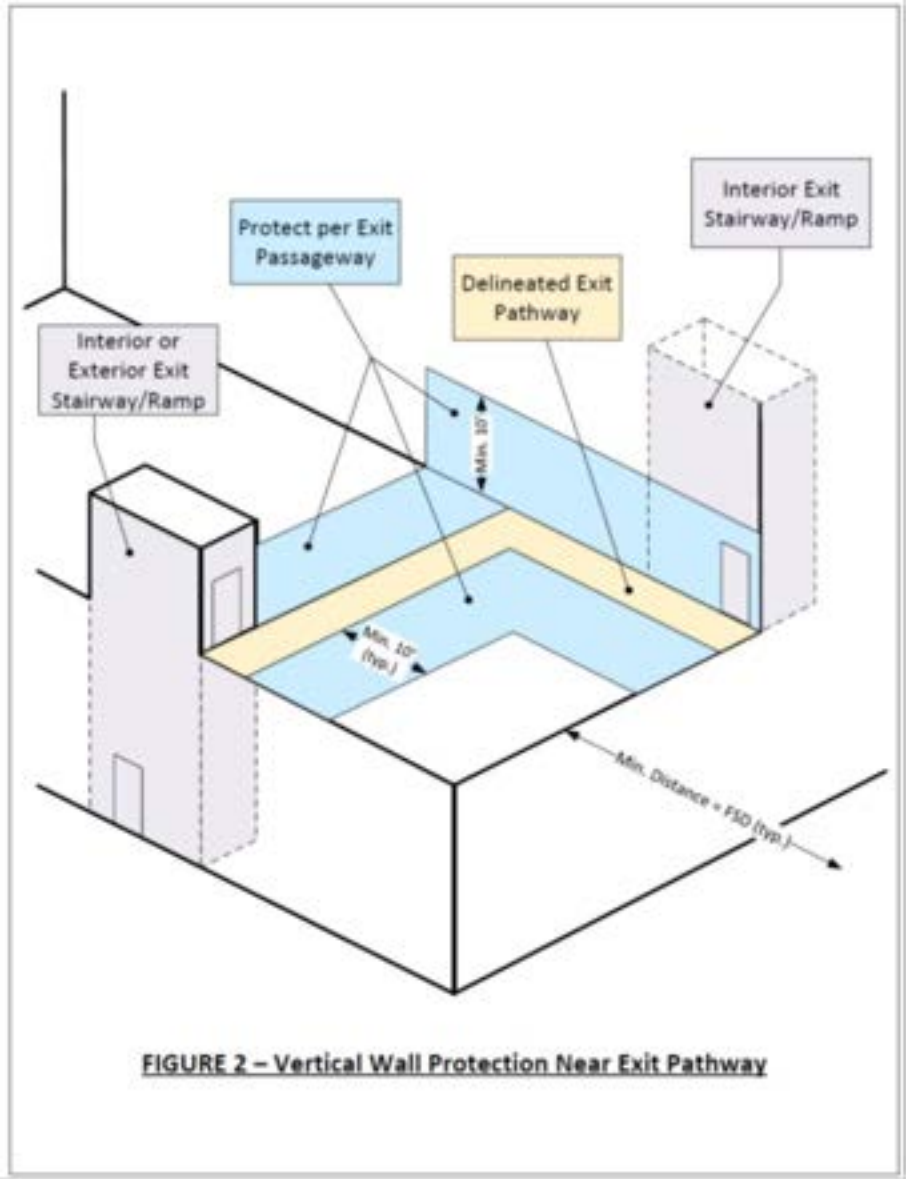


FIGURE 2 – Vertical Wall Protection Near Exit Pathway

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Much depends on what the applicant proposes and what the building official will approve for delineating or marking the exit pathway. Barriers and guards could make sense depending on if amenities are provided on the roof or other outdoor surface. It is more likely that striping and paint will be used. The exit pathway may need to be redone or touched up in the future. A cursory review of online prices for traffic striping paint and pavement marking tape revealed the following:

Paint

HD Supply Solutions: $70.39 to $199.00 per gallon HD Supply Solutions

Pavement marking tape (retroreflective polymer pavement marking tape)

(yellow) 3M Stamark 24"x30 yard: $320 Uline; $416.78 Stop-Painting.com

3M Stamark Surface Preparation Adhesive P50, 1 gallon: $85.07 Industrial General Store

An analysis of the cost of luminous of egress path markings, such as those required by Section 1025, is not included as they are

generally not designed for outdoor use.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change provides a new option to use an exit pathway across a roof to connect two exit components and an exterior exit stairway or ramp to be used as one of the connected components. It is not creating a new requirement, so there is no cost impact or most likely a decrease in cost.
Currently, the only way an outdoor portion of a building like a roof or roof deck can be used as part of the *exit* would be to put enclose that portion of the roof in an exit passageway. Exit passageways are required to have fire resistance rated construction on the floor, ceiling and walls for the entire length of the exit passageway. With this change, at a minimum, someone opting to use the exit pathway approach where other portions of the surface are within 10 feet of the pathway or where the pathway is within a fire separation distance of 10 feet would not need to rate its ceiling while still rating its walls and floor. This is a cost reduction because they don't need to rate the of the ceiling of what would normally be required, an exit passageway. In cases where the exit pathway is more than 10 feet away from other items on the roof and adjacent buildings, only the floor of would need to be rated. Again, this represents a cost reduction from full compliance with the requirements of an exit passageway. In addition, many podium buildings have roofs and other outdoor surfaces that may already be appropriately fire resistance rated due to other code requirements and nothing would need to be required other than marking and lighting the path. This is also a cost reduction from full compliance with an exit passageway. Exit passageways are required to be provided with lighting and markings, so the minimal lighting and path marking requirements for the exit pathways would certainly cost the same or possibly less.

There could be costs associated with maintaining the exit pathway markings over time, depending on the material or product approved by the building official.

The lighting would not present increased costs over lighting already required in an exit pathway.

E97-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved. To leave a protected exit stairway for a path open to the outside and then back into a protected exit stairway does not seem to maintain the the same level of protection to the exit discharge. If an 'exit pathway' is a new exit element, it should be in it's own section, similar to exit passageways, not lumped under the general exit requirements in Section 1022. The stairway termination requirements need to be addressed. Ways to keep the outside path clear need to be addressed. Either clarify what markings are required, or provide something more substantial than just a marked path. There are no limitation on the use of the roof for other occupancies that might be an obstruction for the path of egress. There are no travel distance limits for this element. This seems like it could already be addressed with horizontal exits. (Vote: 13-0)

E97-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202, SECTION 1022, 1022.1, 1022.3, 1022.3.1, SECTION 1023, 1023.3, SECTION 1024, 1024.5, SECTION 1025 (New), 1022.3.2, 1022.3.2.1, 1022.3.2.2, 1022.3.2.3, 1008.3; IFC: SECTION 202, SECTION 1022, [BE] 1022.1, 1022.3, [BE] 1022.3.1, SECTION 1023, [BE] 1023.3, SECTION 1024, [BE] 1024.5, SECTION 1025 (New), 1022.3.2, 1022.3.2.1, 1022.3.2.2, 1022.3.2.3, [BE]

1008.3

Proponents: Jenifer Gilliland, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (jenifer.gilliland@seattle.gov); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

Revise as follows:

EXIT PATHWAY.
An exit component that serves to meet one or more means of egress design requirements and is open to sky and may or may not be open on one or both sides.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, *exit pathways, exterior exit stairways* and *ramps* and *horizontal exits*.

SECTION 1022
EXITS

1022.1 General. *Exits* shall comply with Sections 1022 through ~~1027~~ 1028 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of *exit* protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge.*

1022.3 Exit continuity. Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps*.

1022.3.1 Extension. Where an *exit passageway* is used to provide continuity of an *exit*, the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 or a *horizontal assembly* constructed in accordance with Section 711, or both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited.

Exceptions:

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4.

SECTION 1023
INTERIOR EXIT STAIRWAYS AND RAMPS

Revise as follows:

1023.3 Termination. *Interior exit stairways* and *ramps* shall terminate at an *exit discharge* or a *public way*. **Exception:** A

combination of *interior exit stairways*, *interior exit ramps*, ~~and~~ *exit passageways*, and *exit pathways* constructed in accordance with Sections 1022.3.1, 1023.2, ~~1023.3.1, and~~ 1024, and 1025 respectively, and forming a continuous protected enclosure, shall be permitted to extend an *interior exit stairway* or *ramp* to the *exit discharge* or a *public way*.

SECTION 1024
EXIT PASSAGEWAYS

1024.5 Openings. Exit passageway opening protectives shall be in accordance with the requirements of Section 716. Except as permitted in Section 402.8.7, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section1022.3.1.

Elevators shall not open into an *exit passageway*.

Add new text as follows:

SECTION 1025
EXIT PATHWAYS

Revise as follows:

~~**1022.3.2**~~**1025.1 General ~~Exit pathways.~~** *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section ~~1022.3.2.1~~ 1025.1 through ~~1022.3.2.3~~ 1025.4.

~~**1022.3.2.1**~~**1025.2 Construction and openings.** The floor~~, walls, and openings~~ of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* ~~for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*.~~ Fire resistance rating and opening protection shall extend horizontally not less than 10 feet from the edges of the exit pathway or to the perimeter of the building, whichever is less. Other portions of the building located within 10 feet of the exit pathway shall be separated from the exit pathway by fire-resistance rated construction in accordance with Section 1024 for exit passageways. This separation shall extend vertically from the floor of the exit pathway to a point 10 feet (3048 mm) above the exit pathway, or to the roof line, whichever is lower.

~~**1022.3.2.2**~~**1025.3 Location.** The *exit pathway* shall have a minimum *fire separation distance* of 10 feet (3048 mm) measured at right angles from the exterior edge of the *exit pathway,* to:

1. The closest interior *lot line*.
2. The centerline of a street, an alley, or *public way*.
3. An imaginary line between two *buildings* on the lot.

~~**1022.3.2.3**~~**1025.4 Path marking.** *Exit pathways* shall be delineated or marked to clearly indicate the path of travel, as approved by the *building official.*

1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.

2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3 *Exit pathways*
   2.4. Exit passageways.
   2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.

3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

2024 International Fire Code

EXIT PATHWAY. An exit component that serves to meet one or more means of egress design requirements and is open to sky and may or may not be open on one or both sides.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exit pathways, *exterior exit stairways* and *ramps* and *horizontal exits*.

SECTION 1022
EXITS

[BE] 1022.1 General. *Exits* shall comply with Sections 1022 through ~~1027~~1028 and the applicable requirements of Sections 1003 through 1015. An *exit* shall not be used for any purpose that interferes with its function as a *means of egress*. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the *exit discharge*.

1022.3 Exit continuity. Exits shall be continuous from the point of entry into the *exit* to the *exit discharge*. The path within *exits* is permitted to consist of any combination of *interior exit stairways*, *interior exit ramps*, *exit passageways*, *exit pathways*, *exterior exit stairways*, and *exterior exit ramps*.

[BE] 1022.3.1 Extension. Where an *exit passageway* is used to provide continuity of an *exit*, the *interior* or exterior *exit stairway* and *ramp* shall be separated from the *exit passageway* by a *fire barrier* constructed in accordance with Section 707 of the International Building Code or a *horizontal assembly* constructed in accordance with Section 711 of the International Building Code, or

both. The *fire-resistance rating* of the exit passageway shall be not less than that required for the *interior exit stairway* and *ramp*. A *fire door assembly* complying with Section 716 of the International Building Code shall be installed in the *fire barrier* to provide a *means of egress* from the *interior* or exterior *exit stairway* and *ramp* to the *exit passageway*. Openings in the *fire barrier* other than the *fire door assembly* are prohibited. Penetrations of the *fire barrier* are prohibited. **Exceptions:**

1. Penetrations of the *fire barrier* in accordance with Section 1023.5 shall be permitted.
2. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where there are no openings into the *exit passageway* extension.
3. Separation between an *interior exit stairway* or *ramp* and the *exit passageway* extension shall not be required where the *interior exit stairway* and the *exit passageway* extension are pressurized in accordance with Section 909.20.4 of the International Building Code.

SECTION 1023
INTERIOR EXIT STAIRWAYS AND RAMPS

[BE] 1023.3 Termination. *Interior exit stairways* and *ramps* shall terminate at an *exit discharge* or a *public way*. **Exception:** A combination of *interior exit stairways, interior exit ramps*, ~~and~~ *exit passageways*, and *exit pathways* constructed in accordance with Sections 1022.3.1, 1023.2, ~~1023.3.1,~~ ~~and~~ 1024, and 1025 respectively, and forming a continuous protected enclosure, shall be permitted to extend an *interior exit stairway* or *ramp* to the *exit discharge* or a *public way*.

SECTION 1024
EXIT PASSAGEWAYS

[BE] 1024.5 Openings. *Exit passageway* opening protectives shall be in accordance with the requirements of Section 716 of the International Building Code.
Except as permitted in Section 402.8.7 of the International Building Code, openings in *exit passageways* other than unprotected exterior openings shall be limited to those necessary for *exit access* to the *exit passageway* from normally occupied spaces and for egress from the *exit passageway*.

Where an *interior exit stairway* or *ramp* is extended to an *exit discharge* or a *public way* by an *exit passageway*, the *exit passageway* shall comply with Section 1022.3.1.

Elevators shall not open into an *exit passageway*.

Add new text as follows:

SECTION 1025
EXIT PATHWAYS

Revise as follows:

~~**1022.3.2**~~**1025.1 ~~Exit pathways~~General.** *Exit pathways* shall be permitted to serve as an exit component in the *means of egress* system where they connect *interior* or *exterior exit stairways and ramps* of the same *building* and comply with the requirements in Section ~~1022.3.2.1~~ 1025.1 through ~~1022.3.2.3~~ 1025.4.

~~**1022.3.2.1**~~**1025.2 Construction and openings.** The floor~~, walls, and openings~~ of the *exit pathway* shall be constructed in accordance with Section 1024 for *exit passageways* ~~for a minimum horizontal distance of 10 feet from the edges of *exit pathway* and a minimum vertical distance of 10 feet from the floor of the *exit pathway*~~. Fire resistance rating and opening protection shall extend horizontally not less than 10 feet from the edges of the exit pathway or to the perimeter of the building, whichever is less. Other portions of the building

located within 10 feet of the exit pathway shall be separated from the exit pathway by fire-resistance rated construction in accordance with Section 1024 for exit passageways. This separation shall extend vertically from the floor of the exit pathway to a point 10 feet (3048 mm) above the exit pathway, or to the roof line, whichever is lower.

~~1022.3.2.2~~1025.3 **Location.** The exit pathway shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the exit pathway, to:

1. The closest interior lot line.
2. The centerline of a street, an alley, or public way.
3. An imaginary line between two buildings on the lot.

~~1022.3.2.3~~1025.4 **Path marking.** *Exit pathways* shall be delineated or marked to clearly indicate the path of travel, as approved by the building official.

[BE] 1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   1.1. *Aisles*.
   1.2. *Corridors*.
   1.3. *Exit access stairways* and *ramps*.
2. In *buildings* that require two or more exits or access to exits:
   2.1. Interior *exit access stairways* and *ramps*.
   2.2. Interior and *exterior exit stairways* and *ramps*.
   2.3 Exit pathways
   2.4. Exit passageways.
   2.5. Vestibules and areas on the level of discharge used for *exit discharge* in accordance with Section 1028.2.
   2.6. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the *exit discharge*.
3. In other rooms and spaces:
   3.1. Electrical equipment rooms.
   3.2. *Fire command centers*.
   3.3. Fire pump rooms.
   3.4. Generator rooms.
   3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).

Reason: After reviewing the committee's vote of disapproval, we would like to clarify that the proposal's goal is to create a new exit component, the exit pathway, to allow a roof or similar outdoor surface to be used as part of a building's means of egress.

The proposal is based on the following assumptions:

- This is a new "exit" component and can be daisy-chained together with other exit components. It is **not** part of the "exit **discharge**". See Figure 3 below.
- The space open to sky next to and above a path that traverses a roof or other outdoor surface presents no fire hazard or smoke hazard because it is open.
- The lack of hazard in this pathway and its associated adjacent space creates protection equivalent to that of other exit components.

- The efficacy of the pathway and its associated adjacent space to protect path users is dependent on the width and height of both.
- It is protected from fire below by construction with a fire resistance rating equal to what is a required for an *exit passageway*. Where located too close to other portions of the building, fire rated walls meeting *exit passageway* requirements may be required.
- The concept of an *exit pathway* does not easily fit into any of the current *exit* component sections in Chapter 10. It most resembles an *exit passageway* but without a ceiling, and in some cases, walls.
- Many jurisdictions already approve this configuration using alternative means and methods.
- The code generally doesn't require the marking of or cordoning off of portions of the *means of egress* within buildings.

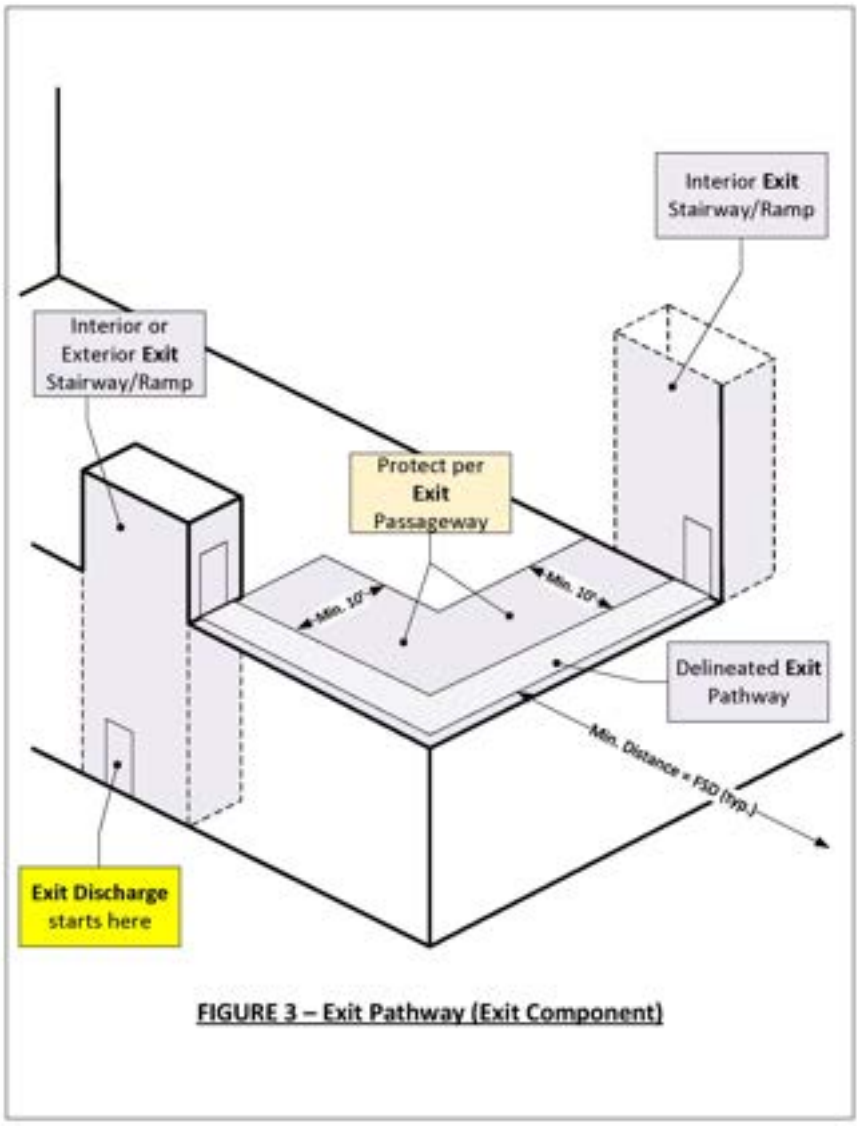


FIGURE 3 – Exit Pathway (Exit Component)

Response to Committee Concerns:

The requirements for exit pathways should be located in a separate Chapter 10 section: Agreed. We have removed this proposed language from 1022 Exits and created a new section **1025 Exit Pathways**.**Leaving a protected exit stairway and traversing an unprotected roof doesn't continue the protection of the exit stairway:** We disagree. What is the hazard posed by the open sky to people exiting a roof? No hazard is posed from an adjacent building if there is proper fire separation distance between the exit pathway and other buildings. There is also no hazard if adequate space is maintained between the pathway and rooftop structures, like photovoltaic panels and modules, and glazing materials, like skylights. Depending on the distance to other buildings and structures on the roof, there could be additional protection required in the form of walls, like *an exit passageway*. We are extending the fire resistive walls in the traditional sense, but the path is protected and safe because of the absence of a hazard. At a minimum, there will always be the protection afforded by the roof/ceiling assembly. See Figure 4. **This should be left to the alternative means and methods process.**

Yes, many jurisdictions do allow this, but lack of a nationwide standard results in inconsistent application of requirements for applicants and building officials alike, not to mention the additional headache and paperwork of the alternative means and methods process. If it can be allowed outright everyone wins.

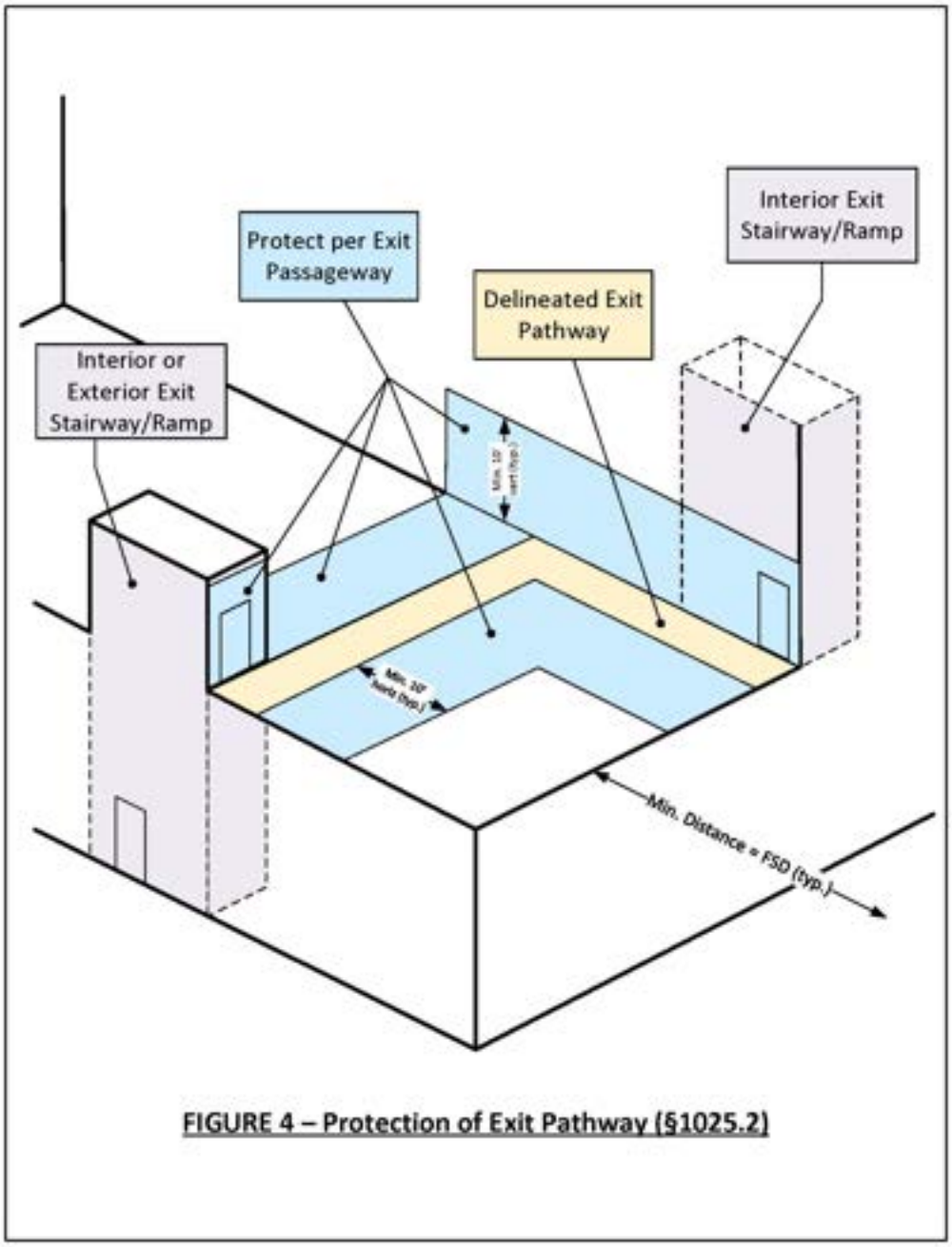


FIGURE 4 – Protection of Exit Pathway (§1025.2)

Stairway termination requirements in 1023.3 and 1023.3.3 need to be addressed/modified. This comment seems to be a misunderstanding of the original proposal and the portion of the building to which the change applies. The pathway connects two exit components, one of which terminates at the exit discharge. The most likely scenario is where an exit stair from one portion of the building connects to an exit pathway that transverses a roof which then connects to another exit stair that ends at the level of exit discharge. See Figure 1 in the reason statement for the original proposal.

Means of egress can only be used for means of egress. A painted walkway doesn't guarantee that the section of the roof the pathway is on will only be used for that purpose. Many other portions of the means of egress are unmarked and are not guaranteed for

their use either. Why would we penalize the *exit pathway* and no other portions of the *means of egress*?

Keeping the pathway clear needs to be addressed. Maintenance for the *means of egress* is addressed by the *International Fire Code* in Section 1031.3.

1031.3 Obstructions. A *means of egress* shall be free from obstructions that would prevent its use, including the accumulation of snow and ice."

Exterior exit stairways and ramps, as well as the *exit discharge*, are also subject to weather conditions, but there are no requirements to keep them clear, aside from the Fire Code. Why would we require an *exit pathway* to meet more stringent requirements than other portions of the *means of egress*? The code is mostly silent on this because of the drastic difference in outdoor conditions. The requirements for maintaining a reliable roof top *exit pathway* in Phoenix, AZ vary greatly from what may be needed in Minneapolis, Mn. Designers need flexibility to make decisions about what works for the client and the location.

The exit pathway is still subject to general means of egress requirements for the use of slip resistant materials and secure attachment.

Clarify what markings are required or provide something more substantial than a marked path. The delineation of an egress path is not required in other portions of the building. Other portions of the means of egress that are unmarked are not guaranteed to only be used for means of egress purposes either. Also, we don't require delineation of any kind of path for people using the roof as an amenity to direct them to the interior or exterior exit stairway. We are going the extra mile by requiring the delineation of the path.

No limits on other rooftop occupancies that might obstruct the MOE. Other portions of the building are not limited in the types of occupancies that can be adjacent to or served by a particular portion of the *means of egress*. Why should exit pathways be? Keeping chairs and other moveable items out of the means of egress is a maintenance issue.

No travel distance limits are provided for this element. Why should there be? There is no travel distance limitation for exit passageways because you are within the *exit* not in the *exit access. Exit pathways, just like exit passageways would* be considered protected portions of the building and are both exit components. A person using either one as part of an *exit* is not exposed to the same hazards as when they are in the *exit access* portion of a building.

This is not needed. You can already do this with horizontal exits. An *exit pathway* gives designers flexibility and is just another option to use instead of a *horizontal exit or exit passageway*. They all serve a similar purpose. *Horizontal exits* have their own constraints, such a requirement for standpipes on both ends of the passageway that a building designer or building owner may not want depending on the design

Cost Impact: Decrease

Estimated Immediate Cost Impact:

See original cost impact statement. No changes.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original cost impact justification. No changes.

Comment (CAH2)# 324

E107-24

IBC: 1027.6; IFC: [BE] 1027.6

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the *building* as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the *building* at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, the separation for the exterior exit stairway or ramp shall extend to the exterior walls. **Exceptions:**

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.
2. Separation from the interior of the *building* is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote exterior exit *stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the *building* is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   3.2. The *open-ended corridors* comply with Section 1020.
   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.
   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
   3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.
4. In Group R-3 occupancies not more than four *stories* in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the *building* where the *exterior exit stairway* or *ramp* discharges directly to grade.

2024 International Fire Code

Revise as follows:

[BE] 1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, the separation for the exterior exit stairway or ramp shall extend to the exterior walls.

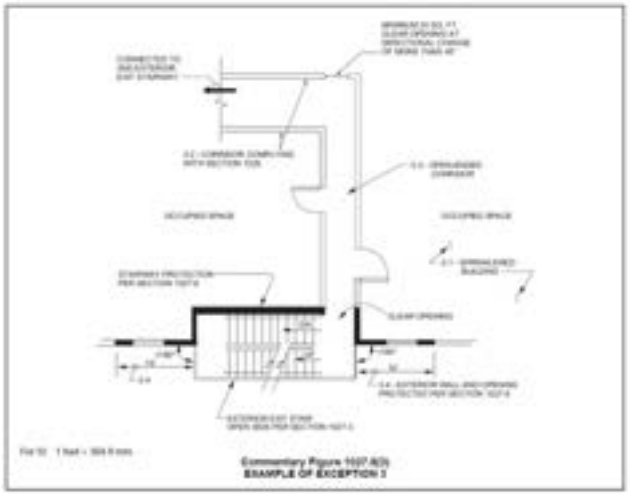
Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
   3.1. The building, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
   3.2. The *open-ended corridors* comply with Section 1020.
   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. <u>At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.</u>
   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
   3.5. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior *stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

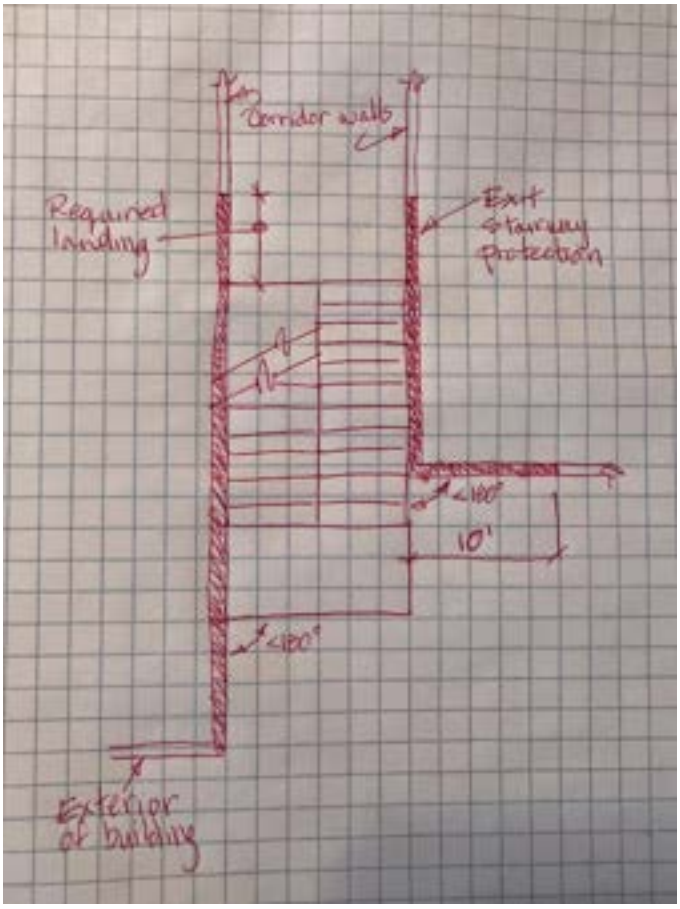
Reason: This proposal has two purposes:

1. Address the rating/separation requirements for exterior exit stairways that are open to a breezeway at the floor landings
2. To address where a stairway may be recessed into the footprint of the building.

There has been a misinterpretation that the walls on the open-ended corridor are exterior walls in accordance with Item 3.4 instead of the corridor in accordance with 3.2. This can lead to unnecessary ratings on the corridor walls. The added sentence in 3.3 clarifies this. The sentence added in the base paragraph is to address a situation where the exterior exit stairway is completely recessed into the building. It is not clear if the walls between the exterior exit stairway and the exterior of the building is an exterior wall. However, BCAC felt the stairway does need to be available for people to leave the building, so the protection needs to be available. The following is an existing figure in IBC Commentary.



The illustration below gives an orientation of a rotated stair that is partially within the building , illustrating where the rating would stop at the extent of the landing as well as illustrating how the requirement for the ten foot of exterior wall is required to be rated when less than 180 degrees.



This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of existing provisions for exterior exit stairway configurations and fire-resistance ratings for the surrounding walls. There are no changes to construction requirements.

E107-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There should be a limit to the distance for the the exterior wall length when the building is recessed. It needs to be more specific on the extent of the wall protection. Suggestion to remove "recessed" and find better wording. (Vote: 12-2)

E107-24

Individual Consideration Agenda

Comment 1:

IBC: 1027.6; IFC: [BE] 1027.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the *building* as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the *building* at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. **Exceptions:**

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.
2. Separation from the interior of the *building* is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote exterior exit *stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.

3. Separation from the *open-ended corridor* of the *building* is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:

   3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

   3.2. The *open-ended corridors* comply with Section 1020.

   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.

   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.

   3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.

4. In Group R-3 occupancies not more than four *stories* in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the *building* where the *exterior exit stairway* or *ramp* discharges directly to grade.

2024 International Fire Code

[BE] 1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. **Exceptions:**

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:

   3.1. The building, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.

   3.2. The *open-ended corridors* comply with Section 1020.

   3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027. At the location where the exterior exit stairway or ramp is open to an open-ended corridor, the separation from the interior of the building shall extend to the extent of the required landing.

   3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.

   3.5. At any location in an *open-ended corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior *stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

Reason: This proposal has been split into two parts so that the two issues with exterior exit stairways can be addressed separately.The revision to Exception 3 address the rating/separation requirements for exterior exit stairways that are open to a breezeway at the floor landings

There has been a misinterpretation that the walls on the open-ended corridor are exterior walls in accordance with Item 3.4 instead of the corridor in accordance with 3.2. This can lead to unnecessary ratings on the corridor walls. The added sentence in 3.3 clarifies this. Where the stairway and the corridor/breezeway, the extent of the stairway protection is for the stairway landing. The corridor/breezeway is not an exterior wall that would require the rating to extend to 10 feet from the top of the stairway. See the reason statement for the original proposal for examples.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of existing provisions for exterior exit stairway configurations and fire-resistance ratings for the surrounding walls. There are no changes to construction requirements.

Comment (CAH2)# 224

Comment 2:

IBC: 1027.6; IFC: [BE] 1027.6

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Revise as follows:

1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the *building* as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the *building* at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, for the purposes of this section, the path of travel at the level of exit discharge shall be considered an egress court and shall comply with Sections 1028 and 1029. **Exceptions:**

1. Separation from the interior of the *building* is not required for occupancies, other than those in Group R-1 or R-2, in *buildings* that are not more than two *stories above grade plane* where a *level of exit discharge* serving such occupancies is the first *story above grade plane*.
2. Separation from the interior of the *building* is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote exterior exit *stairways* or other *approved exits* with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.

3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
    3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
    3.2. The *open-ended corridors* comply with Section 1020.
    3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.
    3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
    3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.
4. In Group R-3 occupancies not more than four *stories* in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the *building* where the *exterior exit stairway* or *ramp* discharges directly to grade.

2024 International Fire Code

Revise as follows:

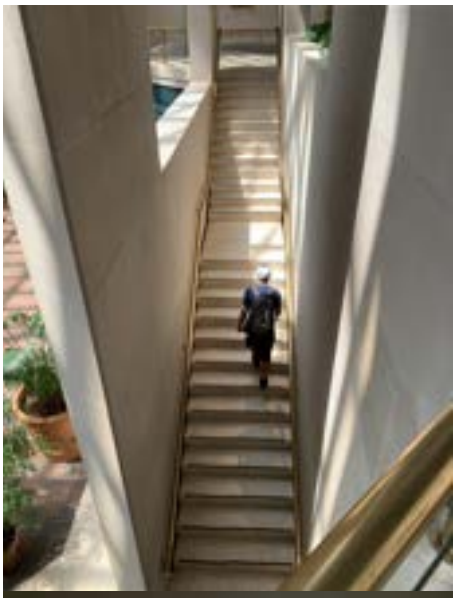
[BE] 1027.6 Exterior exit stairway and ramp protection. *Exterior exit stairways* and *ramps* shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an *exterior exit stairway* or *ramp* and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the *exterior wall* shall be rated in accordance with Section 1023.7. Where the exterior exit stairway is recessed into the building, for the purposes of this section, the path of travel at the level of exit discharge shall be considered an egress court and shall comply with Sections 1028 and 1029. **Exceptions:**

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above *grade plane* where a *level of exit discharge* serving such occupancies is the first story above *grade plane*.
2. Separation from the interior of the building is not required where the *exterior exit stairway* or *ramp* is served by an *exterior exit ramp* or balcony that connects two remote *exterior exit stairways* or other *approved exits*, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the *open-ended corridor* of the building is not required for *exterior exit stairways* or *ramps*, provided that Items 3.1 through 3.5 are met:
    3.1. The *building*, including *open-ended corridors*, and *stairways* and *ramps*, shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
    3.2. The *open-ended corridors* comply with Section 1020.
    3.3. The *open-ended corridors* are connected on each end to an *exterior exit stairway* or *ramp* complying with Section 1027.
    3.4. The *exterior walls* and openings adjacent to the *exterior exit stairway* or *ramp* comply with Section 1023.7.
    3.5. At any location in an open-ended *corridor* where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an *exterior stairway* or *ramp* shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or *toxic* gases.
4. In Group R-3 occupancies not more than four stories in height, *exterior exit stairways* and *ramps* serving individual *dwelling units* are not required to be separated from the interior of the building where the *exterior exit stairway* or *ramp* discharges directly to grade.

Reason: This proposal has been split into two parts so that the two issues with exterior exit stairways can be addressed separately.

This change is to address where a stairway may be recessed into the footprint of the building.

The modification is to address a situation where the exterior exit stairway is completely recessed into the building. The reference to exit discharge and exit court requirements will remind designers that protection is required where the path of travel is confined between when you leave the exterior exit stairway and the public way. Below are a couple of the exterior exit stairways we are attempting to address.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of existing provisions for exterior exit stairway configurations and fire-resistance ratings for the surrounding walls. There are no changes to construction requirements.

Comment (CAH2)# 227

E110-24

IBC: 1028.2; IFC: [BE] 1028.2

Proposed Change as Submitted

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable by exit signage from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

Revise as follows:

[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable by exit signage from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: Through the 2015 editions of both the IBC and NFPA 101, Life Safety Code, these two codes were consistent in their language and interpretation regarding exit discharge of interior exit stairways and ramps through areas of the building on the level of exit discharge. The 2018 edition of NFPA 101 included an amendment to Section 7.7.2(3) that clarified the intent of the code to permit the use of exit signage to direct occupants discharging from an exit enclosure to the nearest exterior exit door:

> *"The interior exit discharge shall lead to a free and unobstructed way to the exterior of the building, and such way shall be readily apparent or shall be identifiable by exit signage from the point of discharge from the exit."*

The 2018 IBC and subsequent 2021 and 2024 editions have lagged behind NFPA 101 and have not yet amended Section 1028.2 Exception 1.1 to provide this clarification.

This proposal will clarify that exit signage is permitted to be used for this purpose and will remove the common misconception that an exterior exit discharge must be visible from the point of exit enclosure termination. The proposal will also bring the IBC back into alignment with NFPA on this issue, as had long been the case until 2018.

Bibliography: NFPA 101, Life Safety Code

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed text clarifies the original intent to allow utilization of exit signage to achieve interior exit stairway discharge through areas of the building on the level of exit discharge. The exit signage required for this purpose would already be required by Section 1013.1 and thus adds no cost."

E110-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This will help identify requirements for lobby exit options for how to determine "readily visible and identifiable". If someone used this exception, this would over ride the exception for lobby entrances to not have exits signs in Section 1013.1. (Vote: 13-0)

E110-24

Individual Consideration Agenda

Comment 1:

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Jeffrey Grove, Coffman Engineers, Coffman Engineers (jeff.grove@coffman.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:

   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible ~~and~~ or identifiable by exit signage from the point of termination of the enclosure.

   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.

   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.

   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:

   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.

   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708. **Exception:** The maximum transmitted temperature rise is not required.

   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible ~~and~~ or identifiable by exit signage from the point of termination of the enclosure.
   1.2. The entire area of the *level of exit discharge* is separated from areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system*. Portions of the *level of exit discharge* with access to the egress path shall either be equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps*.
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: This modification will revise the word “and” to “or” to clarify that Section 1028.1 Exception 1.1 does not require exit signage. Rather, exit signage is one option to meet this exception – the other option is for the exterior exit door to be readily visible. Exit signage may or may not be required based on IBC 1013.1 and its exceptions.

Additionally, the use of the word “or” will bring this code language further into alignment with the corresponding language of NFPA 101 (as outlined in the reason statement for the original E110-24 proposal).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Cost impact remains unchanged from the original code change proposal.

Comment (CAH2)# 766

Comment 2:

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com); Richard Williams, Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests Disapproved

Reason: LEVY: E110-24 was written and approved such that its interpretation by the approving committee is opposite the intent of the author. The proponent of E110 reasons that the "intent of the code [is] to permit the use of exit signage to direct occupants discharging from an exit enclosure to the nearest exterior exit door... This proposal will clarify that exit signage is permitted to be used for this purpose and will remove the common misconception that an exterior exit discharge must be visible from the point of exit enclosure termination." The author intended for directional wayfinding to be acceptable along the path of stair discharge - that is, direct line of sight to an exterior exit door should not be required so long as the path is marked by exit signs. The change was intended to create a leniency for stair discharge and allow for longer and more complicated discharge travel paths than what is currently permitted.

The committee approved this submittal, but for reasons unintended by the proponent. The recorded committee reason is that "If someone used this exception, this would override the exception for lobby entrances to not have exits signs in Section 1013.1." This interpretation was possibly overlooked by the original author. A buildings main exit often does not require exit signage. However, with the proposed change, discharge through a lobby requires the exterior exit door to have exit signage. Additionally, the exit signage required for the stair discharge is tied to the exterior exit door. In the E110 reason statement, the referenced NFPA 101 sections require that the exit signage is required along the path of travel. However, E110 was written in such a way that the exit signage to at the exterior exit door rather than along the path. Ultimately, this proposal was approved as a more stringent requirement than what the IBC previously required, such that the main exit's exit sign exception would not be permitted if a stair discharged through the space.This CAH2 comment proposes to overturn committee action and disapprove of E110 because of the unintended consequence. The additional exit signage required by this change is unnecessary and unjustified. There is no identifiable need or loss history correlated to an exit signs presence (or lack of) at a building's "main" exit after stair discharge. By approving this code modification, we create redundant requirements and further limit building design options unnecessarily. Furthermore, the additional exit sign has an inherent cost increase - something that was not accounted for in the author's proposal or in testimony.

WILLIAMS/CHAPPELL: During the Committee Action Hearing, the proponent stated the purpose for this proposal was to align discharge provisions with NFPA 101, but the reason why this was necessary was not explained, since there are currently many differences between the two codes. In fact, E110 would still result in a difference between the IBC and NFPA because the corresponding NFPA section allows for the exit to be readily apparent OR identifiable by exit signage. E110 states the exit shall be readily visible AND identifiable by exit signage. The proponent acknowledged that NFPA language could be interpreted to be less restrictive than the IBC but that they were trying to go to another recognized standard that also addresses egress. It is not clear to us what was meant by this.

We don’t necessarily have a problem with adding a greater requirement for exit signage for this door, even though there are situations where it could be more restrictive than current code requirements specified per IBC Section 1013.1 exception 2. This was pointed out by a committee member during the testimony. The problem we have is that this language can be read two different ways. First, it can be interpreted as having two separate requirements: A) to provide an exit that is readily visible and B) for that exit to be identifiable by exit signage. That is how it currently reads (except for the additional requirement for exit signage) and based on committee reason statements, this seems to be the way many of them read and understood this. However, this can also be read as one requirement for the exit sign to be readily visible and identifiable. Exit signage would be the sole control, meaning the exterior exit door would not be required to be readily visible when leaving the exit enclosure. This reading appears to align more closely with the proponent’s intent per the reason statement, as compared to the committee’s reason statement.

As currently adopted, this first exception for Section 1028.2 is very limited in what it allows, and it is that way for a reason. In all other situations, the stair must discharge to the outside of the building, or it must be extended to the outside of the building with an exit passageway. We are opposed to this proposal because if read to allow for the exit signage to be the control, it would allow for the exit discharge to be extended indefinitely inside the building as long as signage is provided. This could create a situation that allows for a path from the stair to the exterior of the building that is similar to an exit passageway but is not protected like one. During their testimony one of the proponents stated that distance is not an issue because you are in an area of the building where the greatest distance you could ever have from the stair door to the outside door would be the exit access travel distance. This is not correct since travel distance is satisfied once access is gained into the stair enclosure. When the occupant leaves the interior exit stairway, they are in the exit

discharge, not the exit access. We feel this proposal should be disapproved and this section should be left as it is currently written.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 441

E111-24

IBC: 1028.2; IFC: [BE] 1028.2

Proposed Change as Submitted

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov)

2024 International Building Code

Revise as follows:

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire ~~area~~ story of the *level of exit discharge* is separated from ~~areas~~ stories below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps.*
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

Revise as follows:

[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire ~~area~~ story of the *level of exit discharge* is separated from ~~areas~~ stories below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps.*
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: This is an editorial code change that helps make code application of the requirements more consistent. Interior exit stairway protection terminates at horizontal exits and exterior exit doorways, or the stairway is extended to exterior exit doorways with exit passageways.

As written the IBC uses the undefined term area that some code users interpret to be the portion of the story at the level of exit discharge used to access the exterior exit doorways. Other code users interpret the requirement to apply to the entire story.

The latter interpretation is consistent with the IBC's philosophy that the level of protection along an egress path is not reduced and that the exceptions should be equivalent. Exit passageways, shaft enclosures protecting interior exit stairways and horizontal exits provide protection from the entire story. Additionally, fire sprinkler protection should be throughout the story since the stairway protection protects the stairway from the entire story.

When extended with an exit passageway the path of egress is defined and the protection has a top and sides and a bottom. As a consequence, at a minimum when exception 1.3 is applied the floor between the fire barriers should be fire resistance rated and when the fire sprinkler tradeoff is selected the entire floor above the story below should be protected. Most of the cases we have seen were when the entire story is protected with fire sprinklers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The increased cost of spray fireproofing between IIB and IIA construction is approximately $11 per sq ft. Between IB and IA, it is similar.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost was determined by analyzing the ICC Building Valuation Table and determining average variations across types of construction and occupancies for Type II and Type I.

Group (2021 International Building Code)	IA			IB			IIA		
A-1 Assembly, theaters, with stage	335.89	97%	$13.44	324.58	98%	$12.98	316.94	$12.68	98%
A-1 Assembly, theaters, without stage	307.39	96%	$12.30	296.08	97%	$11.84	288.44	$11.54	97%
A-2 Assembly, nightclubs	269.94	97%	$10.80	261.93	97%	$10.48	254.48	$10.18	97%
A-2 Assembly, restaurants, bars, banquet halls	268.94	97%	$10.76	260.93	97%	$10.44	252.48	$10.10	97%
A-3 Assembly, churches	311.88	96%	$12.48	300.57	97%	$12.02	292.93	$11.72	97%
A-3 Assembly, general, community halls, libraries, museums	266.07	96%	$10.64	254.76	97%	$10.19	246.12	$9.84	97%
A-4 Assembly, arenas	306.39	96%	$12.26	295.08	97%	$11.80	286.44	$11.46	97%
B Business	260.69	96%	$10.43	251.13	96%	$10.05	241.86	$9.67	96%
E Educational	273.46	97%	$10.94	263.96	97%	$10.56	255.62	$10.22	97%
F-1 Factory and industrial, moderate hazard	160.20	95%	$6.41	152.78	94%	$6.11	143.34	$5.73	94%
F-2 Factory and industrial, low hazard	159.20	95%	$6.37	151.78	94%	$6.07	143.34	$5.73	94%
H-1 High Hazard, explosives	149.46	95%	$5.98	142.04	94%	$5.68	133.60	$5.34	94%
H234 High Hazard	149.46	95%	$5.98	142.04	94%	$5.68	133.60	$5.34	94%
H-5 HPM	260.69	96%	$10.43	251.13	96%	$10.05	241.86	$9.67	96%
I-1 Institutional, supervised environment	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
I-2 Institutional, hospitals	434.15	98%	$17.37	424.59	98%	$16.98	415.32	$16.61	98%
I-2 Institutional, nursing homes	302.01	97%	$12.08	292.45	97%	$11.70	283.18	$11.33	97%
I-3 Institutional, restrained	285.86	97%	$11.83	286.31	97%	$11.45	277.03	$11.08	97%
I-4 Institutional, day care facilities	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
M Mercantile	201.37	96%	$8.05	193.36	96%	$7.73	184.91	$7.40	96%
R-1 Residential, hotels	264.67	97%	$10.59	255.41	97%	$10.22	246.77	$9.87	97%
R-2 Residential, multiple family	221.32	96%	$8.85	212.06	96%	$8.48	203.42	$8.14	96%
R-3 Residential, one- and two-family [a]	209.61	97%	$8.38	203.74	98%	$8.15	198.94	$7.96	98%
R-4 Residential, care/assisted living facilities	262.22	96%	$10.49	252.95	97%	$10.12	244.31	$9.77	97%
S-1 Storage, moderate hazard	148.46	95%	$5.94	141.04	93%	$5.64	131.60	$5.26	93%
S-2 Storage, low hazard	147.46	95%	$5.90	140.04	94%	$5.60	131.60	$5.26	94%
U Utility, miscellaneous	114.09	94%	$4.56	107.37	93%	$4.29	99.89	$4.00	93%
Average		96%	$9.79		96%	$9.43		$9.09	96%

E111-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. It is not necessary to protect the entire floor where the intent is to protect the area where occupants are discharging. Protecting stories below would include protecting the entire supporting elements and would be a high cost for minimal benefits. Adding "stories" would not address crawl spaces or other areas below that are not a true story. (Vote: 13-0)

E111-24

Individual Consideration Agenda

Comment 1:

IBC: 1028.2; IFC: [BE] 1028.2

Proponents: Ali Fattah, City of San Diego Development Services Department, San Diego Area Chapter of ICC (afattah@sandiego.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the *building*. The *exit discharge* shall be at grade or shall provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a *building*. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including *atriums*, on the level of discharge provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior *exit* door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire story of the *level of exit discharge* is separated from stories or usable areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps.*
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the *exit discharge* door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the *building*, whichever is less. The distance shall be measured in a straight line between the *exit discharge* door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.
2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp enclosure*.
   2.2. The depth from the exterior of the *building* is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.
3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the *building*.

2024 International Fire Code

[BE] 1028.2 Exit discharge. *Exits* shall discharge directly to the exterior of the building. The *exit discharge* shall be at grade or shall

provide a direct path of egress travel to grade. The *exit discharge* shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required *exits*. **Exceptions:**

1. Not more than 50 percent of the number and minimum width or required capacity of *interior exit stairways* and *ramps* is permitted to egress through areas, including atriums, on the *level of discharge* provided that all of the following conditions are met:
   1.1. Discharge of *interior exit stairways* and *ramps* shall be provided with a free and unobstructed path of travel to an exterior exit door and such *exit* is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire story of the *level of exit discharge* is separated from stories or usable areas below by construction conforming to the *fire-resistance rating* for the enclosure.
   1.3. The egress path from the *interior exit stairway* and *ramp* on the *level of exit discharge* is protected throughout by an *approved automatic sprinkler system* . Portions of the *level of exit discharge* with access to the egress path shall be either equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of *interior exit stairways* or *ramps.*
   1.4. Where a required *interior exit stairway* or *ramp* and an *exit access stairway* or *ramp* serve the same floor level and terminate at the same *level of exit discharge*, the termination of the *exit access stairway* or *ramp* and the exit discharge door of the *interior exit stairway* or *ramp* shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the *interior exit stairway* or *ramp* and the last tread of the *exit access stairway* or termination of slope of the *exit access ramp*.

2. Not more than 50 percent of the number and minimum width or required capacity of the *interior exit stairways* and *ramps* is permitted to egress through a vestibule provided that all of the following conditions are met:
   2.1. The entire area of the vestibule is separated from areas below by construction conforming to the *fire-resistance rating* of the *interior exit stairway* or *ramp* enclosure.
   2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
   2.3. The area is separated from the remainder of the *level of exit discharge* by a *fire partition* constructed in accordance with Section 708 of the International Building Code. **Exception:** The maximum transmitted temperature rise is not required.
   2.4. The area is used only for *means of egress* and *exits* directly to the outside.

3. *Horizontal exits* complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

Reason: The Means of Egress Committee did not approve the original code change since a speaker in opposition observed that the exiting code would not address usable underfloor areas that also need to be separated from the egress path. The added text was adapted from footnote (n) to Table 721.1 (3) of the IBC, where roof ceiling and floor-ceiling assemblies can omit a portion of the assembly above or below when the area above or below is not usable. The proposal separates the level of exit discharge from the stories and usable areas below since the exception allows the egress path from the exit not to be defined as it would be with an exit passageway that would fully encapsulate the egress path.

The committee comments that the proposed code change is excessive because protecting supporting construction would add unnecessary costs is reasonable; however, Section 712.3 requires protection of the horizontal assembly to remain in place for the fire resistance rating. If permanent construction is not required to define the egress path, it would be difficult to define the extent of the partially protected floor insofar as the proposed code change is concerned. In proponent's experience, partially protected buildings are difficult to enforce.

A further reason for the code change is that the actual path is not defined by construction alterations of the level exit discharge over the life of the building. This may result in a modified egress path being located or areas not being protected. This would be a difficult item to determine in plan check and inspection. The scope of exceptions should be the same as the scope of the base code requirement, which is that exits terminate at the exit discharge by extending the interior exit enclosure or terminating it at an exterior exit doorway. The egress path would be at the exterior or fully encapsulated on both sides, above and below, and the supporting construction fully protected for the full span of the supporting construction.

The proponent requests approval as submitted with further modification through public comment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code change is editorial and may result in a cost increase in jurisdictions that do not interpret the term areas as the entire story below.

Comment (CAH2)# 565

E114-24

IBC: 1031.2; IFC: [BE] 1031.2

Proposed Change as Submitted

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, National Association of Home Builders (jmunsterteiger@nahb.org)

2024 International Building Code

Revise as follows:

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

6. In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm).

2024 International Fire Code

Revise as follows:

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

6. <u>In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm).</u>

Reason: The purpose of this code change is to allow an EERO to discharge into a yard that does not directly open onto a public way if a minimum 36-inch-wide path is provided from the yard to the public way. This language is similar to language that was approved in the IRC last cycle. In many cities, new townhouses are being constructed on infill lots with tight space limitations. Back yards may already be enclosed because of placement of fences on neighboring lots. There are many examples of this in cities throughout the country where backyard fences are added after the structure was built leaving existing EERO to discharge into a fenced back yard. In some cases, a builder may want to construct two rows of townhouses that are tight up to the street but that have fenced backyards for each unit. Under the current code, the builder must construct all EERO facing the front of the units, with a window well in the sidewalk to access a basement EERO or forgo the private fenced yards as there will likely not be enough space to provide a 10-foot wide “public way”. The problems with placing an EERO in the front to allow a fenced yard in the back include coordinating the location with entry doors and front steps, coordinating the location with utilities, and providing a secure cover over the window well that prevents passers-by from dropping trash into the window well or falling. The problem with forgoing fenced yards is the loss of security for children and pets, and privacy.

While a 10-foot-wide path between back-to-back fenced yards is almost certainly not feasible, a 3-foot path may be in many cases. The new exception would allow such a path, that occupants could use to get out of their yard after escaping through an EERO or that firefighters could use to access the fenced yard for firefighting and rescue operations without having to breach or climb over a series of fences. In these multi-family arrangements this space most-likely would be a common space maintained by the management company or by an association.

Support for choosing the 36-inch minimum width can be found in NFPA 101 (2024) where exit discharge paths leading to a public way are allowed to be a minimum of 36-inches wide in Section 7.7.1.2 for all occupancies and occupant loads. Similarly, IBC Table 1020.3 allows corridors 36-inches in width when serving any occupant load of less than 50 in all occupancies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. The code change does not change the requirement to provide an EERO for sleeping rooms. Thus, there should be no increase in cost because of this proposal.

There may be a modest savings from the added ability to locate a basement EERO in the rear of the home, where covers may not be required and coordination with utilities is easier.

E114-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: How is the path guaranteed and maintained to the public way? The exception is not needed - it can be permitted with current text. (Vote: 13-1)

E114-24

Individual Consideration Agenda

Comment 1:

IBC: 1031.2; IFC: [BE] 1031.2

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, National Association of Home Builders (jmunsterteiger@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in *stories* with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way, or to an egress balcony that leads to a public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.

2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the *building* is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

6. In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm) and shall be maintained in accordance with the International Fire Code. Pathways shall be located on the same lot or be on property secured for the life of the structure by legal means.
7. Emergency escape and rescue openings shall be permitted to discharge to an egress court complying with Section 1029 or safe dispersal area complying with Section 1028.5.

2024 International Fire Code

Revise as follows:

[BE] 1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one *exit* or access to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth *story above grade plane* shall have not fewer than one *emergency escape and rescue opening* in accordance with this section. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room, but shall not be required in adjoining areas of the *basement*. Such openings shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way* , or to an egress balcony that leads to a *public way* .

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from *basements* or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, *court* or exterior egress balcony that leads to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.

5. Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   5.1. One *means of egress* and one *emergency escape and rescue opening*.

   5.2. Two *means of egress*.

6. In Groups R-2 and R-3, a yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36-inches (914 mm) and shall be maintained in accordance with the International Fire Code. Pathways shall be located on the same lot or be on property secured for the life of the structure by legal means

7. Emergency escape and rescue openings shall be permitted to discharge to an egress court complying with Section 1029 or safe dispersal area complying with Section 1028.5.

Reason: The purpose of this comment is to address committee concerns and questions with the original proposal. The code change was intended to allow an Emergency Escape and Rescue Opening (EERO) to discharge into a yard that does not directly open onto a public way if a minimum 36-inch-wide path is provided from the yard to the public way.

When discussing EEROs, one must consider that an EERO is not a component of the Means of Egress system (MOES). MOE is defined in the IBC and IFC. The MOES is made up of three components, the Exit Access, Exit and Exit Discharge. Definitions from the 2024 IBC are included here for clarity:

[BE]EMERGENCY ESCAPE AND RESCUE OPENING. *An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.*

[BE]MEANS OF EGRESS. *A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.*

[BE]EXIT ACCESS. *That portion of a means of egress system that leads from any occupied portion of a building or structure to an exit.*

[BE]EXIT. *That portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, interior exit stairways and ramps, exit passageways, exterior exit stairways and ramps and horizontal exits.*

[BE]EXIT DISCHARGE. *That portion of a means of egress system between the termination of an exit and a public way.*

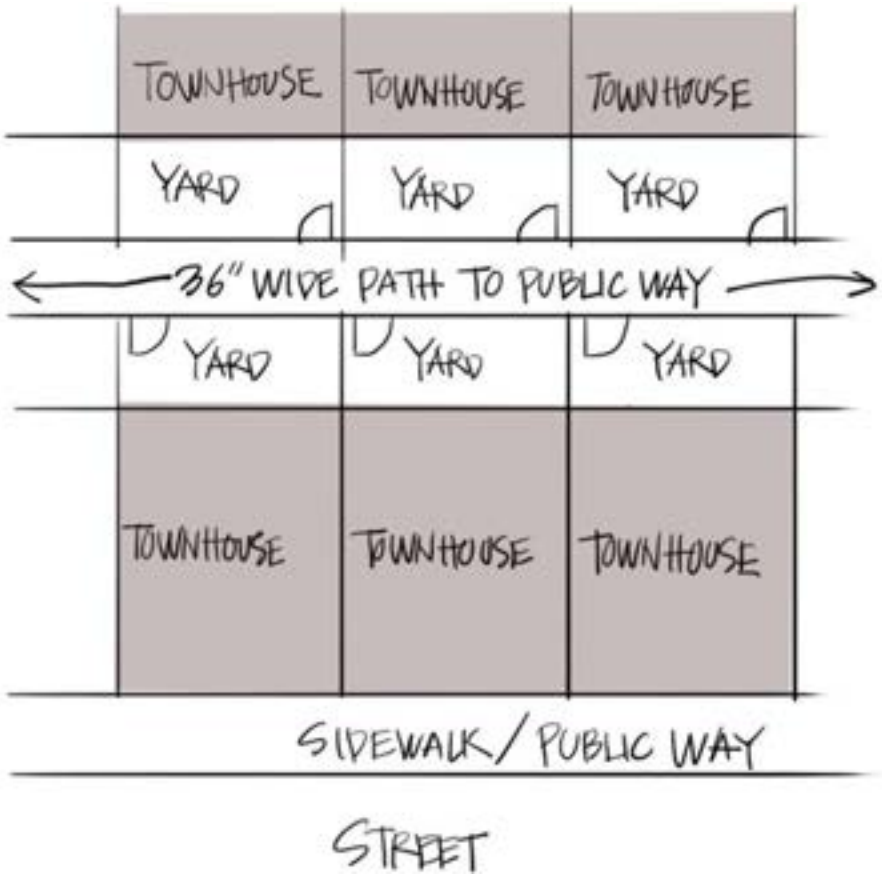
Considering these definitions one can see that EEROs are not treated the same as other MOE components in chapter 10. Much of chapter 10 doesn't apply directly to an EERO, because they are not part of the MOES, as its defined. In this context, one also shouldn't apply more restrictive requirements to EERO than the other exiting components.

To address committee concerns about other options the code provides, Exception 7 was added to allow them to discharge to an egress court. An additional method of discharging to a safe dispersal area is also referenced. While the committee felt the code already allows this, keep in mind EEROs are not currently included in the definitions as an exit component, and there are examples where code officials have interpreted otherwise.

The originally proposed Exception 6 was revised to clarify that if providing the path, maintenance shall be in accordance with the International Fire Code, and that the pathway shall be located on the same lot or be on property secured for the life of the structure by legal means. Legal means could be through legal easements, deeded access or other property rights considerations, none of which are typically addressed directly in the building code. There is no nationwide standard applicable to the terminology so the phrase "by legal means" is used.

The yards addressed in item 6 could be enclosed with fences or building walls or by other means. As it applies to the path being unobstructed, the term would carry the meaning as it applies to other egress components and paths. All building means of egress paths encounter doors or gates that typically are not considered as an obstruction to the path of travel; the same logic should apply in this case. In 1003.6 of the 2024 IBC it says "***Obstructions*** *shall not be placed in the minimum width or required capacity of a means of egress*

component except projections permitted by this chapter." Code Officials should apply the same interpretation of an obstruction in the path from an EERO as they previously have when applying the Means of Egress Continuity Section 1003.6.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code change does not change the requirement to provide an EERO for sleeping rooms. Thus, there should be no increase in cost because of this proposal.

There may be a modest savings from the added ability to locate a basement EERO in the rear of the home, where covers may not be required and coordination with utilities is easier.

Comment (CAH2)# 273

E117-24

IBC: 1105.1

Proposed Change as Submitted

Proponents: Steve Thomas, Shums Coda Associates, Himself (sthomas@coloradocode.net)

2024 International Building Code

Revise as follows:

1105.1 Public entrances. In addition to accessible entrances required by Sections 1105.1.2 through 1105.1.8, at least 60 percent of all *public entrances* shall be accessible. **Exceptions:**

1. An accessible entrance is not required to areas not required to be accessible.
2. Loading and *service entrances* that are not the only entrance to a tenant space.
3. Groups R-2, R-3 or R-4 occupancies containing Accessible, Type A or Type B Units, including accessory occupancies in accordance with Section 508.2 shall be provided with no fewer than one accessible public entrance.

Reason: The Federal Fair Housing Act does not require more than one entrance to buildings regulated under that standard. The intent of this proposal is to be consistent with those provisions and clarify that 60% of the entrances are not required to be accessible but that at least one entrance must be accessible. Section 1108.4 states the following:

Not fewer than one accessible route shall connect accessible building or facility entrances with the primary entrance of each Accessible unit, Type A unit and Type B unit within the building or facility and with those exterior and interior spaces and facilities that serve the units.

We believe that this provides supporting documentation that only one accessible route and entrance is required to a residential building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification of the intent of the code. This requirement is consistent with the Fair Housing Act and the current code language in 1105.1.8.

E117-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: Allowing for one accessible entrance for apartment buildings would be consistent with Fair Housing. This will also align with Sections 1105.1.8 and 1108.4. (Vote: 10-4)

E117-24

Individual Consideration Agenda

Comment 1:

Proponents: C. Scott Anderson, City of Minneapolis, Self (c.scott.anderson@minneapolismn.gov) requests Disapproved

Reason: The committee should reconsider its actions from the hearings in April and disapprove this change.

2000 IBC required 50% of entrances to be accessible.

2006 changed to 60% of public entrances to be accessible.

18 years of requiring a majority of public entrances to be accessible.

FHA – published in 1996 and updated in 1998 – 26 year old standard. There is no indication that it will be updated in the future.

FHA pages 1.32 + 1.34 acknowledges that non-accessible entrances while acceptable under the guidelines may be required to be accessible to meet Local, state or other emergency egress requirements.

Reason statement in E117-24 references IBC 1108.4 which is accessible route not accessible entrances. This section requires an accessible route connect the unit entrance to ALL accessible building entrances.

The reason statement also references IBC 1105.1.8 as justification, however that section is specific to the individual dwelling unit entrance not the building as a whole.

Accepting this proposal could easily result in the only accessible entrance to a new apartment building be the one most remote from the "front door". Worse it could result in a condition where the only accessible entrance is located in the parking garage.

The fact that ICC requires a higher level accessibility than a 26 year old federal standard is not surprising, nor unusual. The FHA standard for example has no requirements for type A or accessible units. Should we therefore eliminate these unit types? For the sake of uniformity of standards.

The current requirement meets the FHA requirement. If you have 60% of public entrance accessible then at least one is, therefore the requirement is met. This is not a conflict in the standards or requirements. This proposed change significantly reduces the ability of people with disabilities to access R-2 facilities and should not be approved.

As an alternative to total disapproval, the proposal could be modified so that it is limited to R-3 and R-4 occupancies. These are smaller structures and often only have one or perhaps two entrances as a result of their size.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 99

E119-24

IBC: 1106.3.1 (New)

Proposed Change as Submitted

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com); Richard Williams, CWA Consultants, Self (richard@cwaconsultants.net); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

1106.3 Groups R-2, R-3 and R-4. Accessible parking spaces shall be provided in Group R-2, R-3 and R-4 occupancies in accordance with the greatest number of parking spaces of any of the following:

1. In Group R-2, R-3 and R-4 occupancies that are required to have *Accessible*, Type A or *Type B dwelling units* or *sleeping units*, at least 2 percent, but not less than one, of each type of parking space provided shall be accessible.
2. Where at least one parking space is provided for each *dwelling unit* or *sleeping unit*, at least one accessible parking space shall be provided for each *Accessible* and *Type A unit*.

Add new text as follows:

1106.3.1 Parking for other than residents. In parking lots serving Group R-2, R-3 and R-4 occupancies, where parking spaces are provided for persons other than residents, parking for such spaces shall be provided in accordance with Table 1106.2.

Reason: The additional text is necessary to clarify that the parking spaces at residential facilities can be based upon each “facility” and that guest parking, employee parking, parking for the leasing office, etc. are not intended to be included as parking the calculation for residential parking noted in Section 1106.3. The language is the same as that in Section 208.2.3.3. This is also consistent with the manner in which HUD interprets the condition.

Bibliography: 2010 ADA Standards for Accessible Design

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The intent is only to provide clarity to the condition where confusion has been present for non-resident parking requirements.

E119-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This is a clarification for where visitor/business parking is indicated on the site. This matches the current intent of the code and this is how this is commonly interpreted. (Vote: 10-4)

E119-24

Individual Consideration Agenda

Comment 1:

IBC: 1106.3.1

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, National Association of Home Builders (jmunsterteiger@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1106.3.1 Parking for ~~other than residents~~ serving other facilities. In parking lots serving Group R-2, R-3 and R-4 occupancies, where parking spaces are provided ~~for persons other than residents~~ serving other facilities, parking for such ~~spaces~~ facilities shall be provided in accordance with ~~Table~~ Section 1106.2.

Reason:
The purpose of this committee comment is to accomplish two things. First, referencing Section 1106.2 in place of a direct refence to Table 1106.2 preserves the exceptions found in that section. There is no reason these exceptions should not continue to be applicable in the context of this code change.
The second change is modifying the text "for persons other than residents" with" serving other facilities". Accessible parking is based on each "facility" and by the code's definition, a signed parking space is not a separate facility. The proponents original reason statement also says parking is based "upon each facility" and since that is a defined term and that the term is used throughout the fair housing design manual it should be used here.

Attached to this proposal are pages from the Fair Housing Act Design Manual and Fair Housing Act Accessibility Guidelines. Examples referenced are as annotated in the attachment.
On PDF page 2, Example 1 it is clear that parking shown is a separate parking facility serving a non-residential facility. In this example parking is calculated separately using Section 1106.2. But this isn't what this proposal is addressing as it was submitted.
On PDF page 2, Example 2 a single residential building and pool are served by two surface parking lots. And one can surmise from the driveway leading to the left side of the building that an enclosed parking structure is also provided under the building. One can also surmise that the striped spaces indicate required access aisles at curb ramps as shown. As many as 6 accessible parking spaces are shown. What this proposal as submitted says is that if you then added a sign that says parking for deliveries or guest parking, additional accessible spaces are required because there are no longer 3 parking facilities, it is now 5. Each new "facility" requires at least one parking space with an access aisle. This does not fit the definition of a separate parking facility and doesn't meet the intent of what the FHA documents describe for parking.
The proponents' reason statement referenced HUD documents as requiring separate accessible parking for guests, and those documents simply don't state that. What they do say is that when visitor parking spaces are provided, such parking must be "sufficient" to provide access. The Guidelines do not specify a number or percentage of accessible visitor spaces and no evidence was provided that new residential buildings are being provided with fewer numbers of accessible parking spaces than required. Guest parking is most often provided away from the main entrance and guests are permitted to park in any accessible parking spaces.
It is however understood that if the leasing office or a common use space were provided as separate buildings then the parking specific to them would need to provide accessible parking in compliance with Section 1106.2. This is clearly referenced in the HUD documents and the change in this comment makes it clear that this is the intent.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impact is anticipated with this change. But without these clarifications, costs could be incalculable.

Attached Files

- **E119-24 Attachment.pdf**
  https://www.cdpaccess.com/comment/281/32198/files/download/7897/

Comment (CAH2)# 281

E120-24

IBC: 1107.2, 1107.2.1, 1107.2.2, 1107.2.2.1 (New), 1107.2.3 (New), 1107.2.3.1 (New), 1107.2.3.2 (New), 1107.2.3.3 (New), 1107.2.4 (New), 1107.2.4.1 (New), 1107.2.4.2 (New), 1112.1

Proposed Change as Submitted

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations. *Electrical vehicle charging stations* shall comply with Sections 1107.2.1 ~~and 1107.2.2~~ through 1107.2.4. **Exceptions:**

1. *Electrical vehicle charging stations* provided to serve Group R-3 and R-4 occupancies are not required to comply with this section.
2. Electric vehicle charging stations used exclusively by buses, trucks, other delivery vehicles, law enforcement vehicles and motor pools are not required to comply with this section.

1107.2.1 Number of accessible vehicle spaces. Not less than 5 percent of vehicle spaces on the *site* served by electrical vehicle charging systems, but not fewer than one for each type of electric vehicle charging system, shall be accessible. Where new electric vehicle charging stations are installed in facilities with existing electric vehicle charging stations, the total number of accessible spaces provided shall include both existing and new electric vehicle charging stations. Where an electric vehicle charging station charger can simultaneously charge more than one vehicle, the number of electric vehicle charging stations provided shall be considered equivalent to the number of electric vehicles that can be simultaneously charged. Parking spaces serving electric vehicle charging stations shall not be permitted to count towards the number of accessible parking spaces required by Section 1106.

1107.2.2 Vehicle space size. Accessible vehicle charging spaces shall ~~comply with the requirements for a van accessible parking space that is~~ be132 inches (3350 mm) minimum in width, 240 inches (6096 mm) minimum in length, and 98 inches (2489 mm) minimum in height with an adjoining access aisle ~~that is 60 inches (1525 mm) minimum in width~~ complying with Section 1107.2.3.

Add new text as follows:

1107.2.2.1 Vehicle charging space marking. The vehicle charging spaces shall be marked to define the width and length. Where vehicle charging spaces are marked with lines, the width measurements of vehicle charging spaces and adjacent access aisles shall be made from the centerline of the markings. **Exceptions:**

1. Where parking spaces or access aisles are not adjacent to another vehicle charging space or access aisle, measurements shall be permitted to include the full width of the line defining the vehicle charging space or access aisle.
2. Vehicle charging space in pull-through electric vehicle charging stations are not required to comply with this section.

1107.2.3 Access aisle. The vehicle charging spaces shall have an adjacent access aisle complying with Section 1107.2.3.1 through 1107.2.3.3. Access aisles shall adjoin an accessible route. Two vehicle charging spaces shall be permitted to share a common access aisle. Access aisles shall not overlap with the vehicular way. The vehicle charging spaces shall be permitted to have access aisles placed on either side of the vehicle charging space.

1107.2.3.1 Width. Access aisles serving the vehicle charging spaces shall be 60 inches (1525 mm) minimum in width.

1107.2.3.2 Length. Access aisles shall extend the full length of the vehicle charging spaces they serve.

1107.2.3.3 Marking. Access aisles shall be marked so as to discourage parking in them. Where access aisles are marked with lines, the width measurements of access aisles and adjacent vehicle charging spaces shall be made from the centerline of the markings. Exceptions:

1. Where access aisles or vehicle charging spaces are not adjacent to another access aisle or vehicle charging space, measurements shall be permitted to include the full width of the line defining the access aisle or vehicle charging space
2. Vehicle charging space in pull-through EV charging stations are not required to comply with this section.

1107.2.4 Accessible routes. Accessible routes shall be provided to serve *electric vehicle charging stations* in accordance with Sections 1107.2.4.1 and 1107.2.4.2.

1107.2.4.1 Building or facility. Accessible *electric vehicle charging stations* that serve a building or facility on the same site shall be located along an *accessible route* providing access to an *accessible* building entrance. Where *accessible electric vehicle charging stations* do not serve a building or facility on the same site, they shall be located along an accessible route providing access to the *public way.*

1107.2.4.2 Charging stations. *Accessible electric vehicle charging stations* shall be provided with an *accessible route* between the *accessible* aisle serving it and all related operable parts and other equipment. When a vehicle is being charged, the *accessible route* shall not be obstructed by the cable between the vehicle and the charging station.

Revise as follows:

1112.1 Signs. Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations.

1. Accessible parking spaces required by Section 1106.2. **Exception:** Where the total number of parking spaces provided is four or less, identification of accessible parking spaces is not required.
2. Accessible parking spaces required by Section 1106.3. **Exception:** In Group I-1, R-2, R-3 and R-4 *facilities*, where parking spaces are assigned to specific *dwelling units* or *sleeping units*, identification of accessible parking spaces is not required.
3. Accessible electric vehicle charging station signs shall include “Accessible EV Charing - Use Last”. Signs shall be 60 inches (1525 mm) minimum above the floor of the vehicle charging space, measured to the bottom of the sign.
4. Accessible passenger loading zones.
5. Accessible toilet or bathing rooms where not all toilet or bathing rooms are *accessible*.
6. Accessible entrances where not all entrances are accessible.
7. Accessible checkout aisles where not all aisles are accessible. The sign, where provided, shall be above the checkout aisle in the same location as the checkout aisle number or type of checkout identification.
8. Accessible dressing, fitting and locker rooms where not all such rooms are accessible.
9. *Accessible areas of refuge* in accordance with Section 1009.9.
10. Exterior areas for assisted rescue in accordance with Section 1009.9.
11. In recreational *facilities*, lockers that are required to be accessible in accordance with Section 1110.12.

Reason: This code change is proposing to add language to more closely align accessibility requirements with the existing requirements for parking and accessibility in Section 1106 and ANSI A117.1 as well as the recommendations from the U.S. Access board while allowing for more sustainable implementation. The current language attempts to rely on the provisions in ANSI 117.1 to identify the requirements of vehicle charging spaces such as is done with accessible parking spaces. Currently, ANSI 117.1 does not have requirements specific to vehicle charging spaces. This leaves language open to misinterpretation and increases the probability of

conflicts between the two code documents.

The vehicle space size was chosen based on the recommendations of the U.S. Access Board. It was determined that these mobility features allow sufficient space for a person who uses a mobility device to exit and maneuver around the vehicle, retrieve the EV connector, and plug the connector into the electric vehicle charging inlet. Since EVs do not have a uniform vehicle charging inlet location, a larger vehicle charging space is needed to maneuver around all sides of the electric vehicle.

The current version of the code would allow for the accessible charging stations to be counted towards the overall accessible parking requirement for the site. Making the charging station a required accessible parking space with accessible signage could potentially prevent people who are able bodied from being permitted to utilize the charging stations without facing fines and/or other legal penalties. In a small group of charging stations this could lead to an extremely low utilization rate on the charging stations affecting the viability of the installation. By allowing smaller groups of charging stations to be accessible without requiring them to be dedicated, the utilization rates will be higher. Adding the signage requirement to Section 1112.1 would further clarify anyone may use the accessible charging space with preference that it be used last. The overall resources required will be reduced allowing for a more rapid implementation of the charging network.

Adding a requirement to provide access to a building or public way is necessary to provide equal access. An accessible route to a building will by default provide access to a public way as the code already requires buildings be connected to a public way by an accessible route. Requiring charging stations not on a site with buildings to connect to a public way allows users to have access to public transportation or businesses off site. While many charging stations are rapid charging stations, some take a significant amount of time to complete a charge. In that time people may walk to get some food or use a nearby restroom facility. Another scenario where this becomes important is in the event the vehicle becomes disabled at the charging station and the user needs to leave the site to seek shelter or other transportation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Typical fast charger equipment cost is $30,000-$50,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

By eliminating the need to install a dedicated accessible underutilized charger, the overall number of chargers can be reduced by at least 1. There are too many variables to estimate the additional infrastructure cost. Distance from utility access to 3 phase power, free capacity on existing service, site characteristics, ect. are all highly variable contributors to the construction cost.

E120-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. The next edition of the A117.1 will include technical criteria for EV charging spaces so a lot of this text is not needed. The proponent might want to consider coming back with just the requirement for the accessible route from the EV charging spaces to the building. (Vote 11-2)

E120-24

Individual Consideration Agenda

Comment 1:

IBC: 1107.2, 1107.2.1, 1107.2.2, 1107.2.2.1 (New), 1107.2.2.2 (New), 1112.1

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Revise as follows:

1107.2 Electrical vehicle charging stations. *Electrical vehicle charging stations* shall comply with Sections 1107.2.1 ~~and~~ through ~~1107.2.2~~ 1107.2.2.2. **Exceptions:**

1. *Electrical vehicle charging stations* provided to serve Group R-3 and R-4 occupancies are not required to comply with this section.
2. Electric vehicle charging stations used exclusively by buses, trucks, other delivery vehicles, law enforcement vehicles and motor pools are not required to comply with this section.

1107.2.1 Number of accessible vehicle spaces. Not less than 5 percent of vehicle spaces on the *site* served by electrical vehicle charging systems, but not fewer than one for each type of electric vehicle charging system, shall be accessible. . Where an electric vehicle charging station charger can simultaneously charge more than one vehicle, the number of electric vehicle charging stations provided shall be considered equivalent to the number of electric vehicles that can be simultaneously charged. Parking spaces serving electric vehicle charging stations shall not be permitted to count towards the number of accessible parking spaces required by Section 1106 unless they meet all of the requirements for accessible parking spaces in addition to the requirements for electric vehicle charging stations.

1107.2.2 ~~Vehicle space size~~ Accessible routes. ~~Accessible vehicle spaces shall comply with the requirements for a van accessible parking space that is 132 inches (3350 mm) minimum in width with an adjoining access aisle that is 60 inches (1525 mm) minimum in width.~~ Accessible routes shall be provided to serve electric vehicle charging stations in accordance with Sections 1107.2.2.1 and 1107.2.2.2.

Add new text as follows:

1107.2.2.1 Building or facility. Accessible electric vehicle charging stations that serve a building or facility on the same site shall be located along an accessible route providing access to an accessible building entrance. Where accessible electric vehicle charging stations do not serve a building or facility on the same site, they shall be located along an accessible route providing access to the public way.

1107.2.2.2 Charging stations. Accessible electric vehicle charging stations shall be provided with an accessible route between the accessible aisle serving it and all related operable parts and other equipment. When a vehicle is being charged, the accessible route shall not be obstructed by the cable between the vehicle and the charging station.

Revise as follows:

1112.1 Signs. Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations.

1. Accessible parking spaces required by Section 1106.2.
   Exception: Where the total number of parking spaces provided is four or less, identification of accessible parking spaces is not required.

2. Accessible parking spaces required by Section 1106.3.
   Exception: In Group I-1, R-2, R-3 and R-4 *facilities*, where parking spaces are assigned to specific *dwelling units* or *sleeping units*, identification of accessible parking spaces is not required.

3. Accessible passenger loading zones.

4. Accessible toilet or bathing rooms where not all toilet or bathing rooms are *accessible*.

5. Accessible entrances where not all entrances are accessible.

6. Accessible checkout aisles where not all aisles are accessible. The sign, where provided, shall be above the checkout aisle in the same location as the checkout aisle number or type of checkout identification.

7. Accessible dressing, fitting and locker rooms where not all such rooms are accessible.

8. *Accessible areas of refuge* in accordance with Section 1009.9.

9. Exterior areas for assisted rescue in accordance with Section 1009.9.

10. In recreational *facilities*, lockers that are required to be accessible in accordance with Section 1110.12.

11. Accessible electric vehicle charging station signs shall include “Accessible EV Charging - Use Last”. Signs shall be 60 inches (1525 mm) minimum above the floor of the vehicle charging space, measured to the bottom of the sign.

Reason: During CAH 1, the committee voted this proposal down based on the desire that the technical language be placed in ICC A117.1. The original proposal was written with these items in it due to the fact A117.1 has not been finalized and there is no guarantee that it will be adopted as part of the 2027 IBC. In an effort to preserve the scoping previsions of this code change proposal in the appropriate location of the IBC, the technical requirements have been removed and left to ICC A117.1. Part of this change was removing the vehicle charging station space size as it is technical in nature and would also be better left to ICC A117.1.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Information is unchanged from original proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

Information is unchanged from original proposal.

Comment (CAH2)# 486

Comment 2:

IBC: 1112.1

Proponents: Steven Rosenstock, Edison Electric Institute, Edison Electric Institute (srosenstock@eei.org); Genevieve Cullen, Electric Drive Transportation Association (EDTA), EDTA (gcullen@electricdrive.org); Emily Kelly, ChargePoint (emily.kelly@chargepoint.com); Rick Tempchin, Alliance for Transportation Electrification (rick@evtransportationalliance.org); Tessa Sanchez, Tesla, Tesla, Inc. (tesanchez@tesla.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1112.1 Signs. Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations.

1. Accessible parking spaces required by Section 1106.2. **Exception:** Where the total number of parking spaces provided is four or less, identification of accessible parking spaces is not required.

2. Accessible parking spaces required by Section 1106.3. **Exception:** In Group I-1, R-2, R-3 and R-4 *facilities*, where parking spaces are assigned to specific *dwelling units* or *sleeping units*, identification of accessible parking spaces is not required.

3. ~~Accessible electric vehicle charging station signs shall include "Accessible EV Charing - Use Last". Signs shall be 60 inches (1525 mm) minimum above the floor of the vehicle charging space, measured to the bottom of the sign.~~

4. Accessible passenger loading zones.

5. Accessible toilet or bathing rooms where not all toilet or bathing rooms are *accessible*.

6. Accessible entrances where not all entrances are accessible.

7. Accessible checkout aisles where not all aisles are accessible. The sign, where provided, shall be above the checkout aisle in the same location as the checkout aisle number or type of checkout identification.

8. Accessible dressing, fitting and locker rooms where not all such rooms are accessible.

   Accessible areas of refuge in accordance with Section 1009.9.

10 Exterior areas for assisted rescue in accordance with Section 1009.9.

11. In recreational *facilities*, lockers that are required to be accessible in accordance with Section 1110.12.

Reason: With the requirements for EV space marking already included in Section 1107, there is no need for a sign. Also, the phrase "use last" will likely cause confusion, since EV owners who need the accessible parking are allowed to use the space (and the charging) first.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Eliminating the requirement for accessible EV charging station signs will reduce the cost.

Estimated Immediate Cost Impact Justification (methodology and variables):

It will reduce the immediate costs by taking out the requirement for EV charging station signs.

Estimated Life Cycle Cost Impact:

This will reduce life cycle costs as signs will not need to be replaced in the future.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Eliminating the first cost and future cost of a sign creates $0 life cycle costs, which will be lower than the cost to purchase, maintain, and replace a sign.

Comment (CAH2)# 412

E122-24

IBC: 1108.5.1.1, 1108.5.1.2, 1108.5.2.1, 1108.5.4, 1110.2.2, 1110.2.2.1, 1110.2.2.2, 1110.2.2.2.1, 1110.2.2.2.2, 1110.2.2.2.3, 1110.2.2.3, 1110.2.2.4, 1110.2.2.5, 1110.2.2.6, 1110.2.3, 1110.2.3.1, 1110.2.3.2, 1110.2.3.3, 1110.2.3.3.1, 1110.2.3.3.2, 1110.2.3.4, 1110.2.3.5, 1110.2.3.6, 1110.2.3.7, 1110.2.3.8, 1110.2.3.9

Proposed Change as Submitted

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com); Gene Boecker, CCI, self (geneb@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com)

2024 International Building Code

1108.5 Group I. *Accessible units* and *Type B units* shall be provided in Group I occupancies in accordance with Sections 1108.5.1 through 1108.5.5.

1108.5.1 Group I-1. *Accessible units* and *Type B units* shall be provided in Group I-1 occupancies in accordance with Sections 1108.5.1.1 and 1108.5.1.3.

Revise as follows:

1108.5.1.1 Accessible units. In Group I-1, Condition 1, at least 4 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*. *Accessible dwelling units* and *sleeping units* shall be dispersed among the various classes of units. **Exceptions:**

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 50 percent of the *Accessible units.*
2. Roll-in-type showers shall be permitted to comply with assisted bathing requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of the *Accessible units*.

1108.5.1.2 Accessible units in Group I-1, Condition 2. In Group I-1, Condition 2, at least 10 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*. *Accessible dwelling units* and *sleeping units* shall be dispersed among the various classes of units. **Exceptions:**

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 50 percent of the *Accessible units.*
2. Roll-in-type showers shall be permitted to comply with assisted bathing requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of the *Accessible units*.

1108.5.1.3 Type B units. In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence* , every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*. **Exception:** The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

1108.5.2 Group I-2 nursing homes. *Accessible units* and *Type B units* shall be provided in *nursing homes* of Group I-2, Condition 1 occupancies in accordance with Sections 1108.5.2.1 and 1108.5.2.2.

Revise as follows:

1108.5.2.1 Accessible units. At least 50 percent but not less than one of each type of the *dwelling units* and *sleeping units* shall be *Accessible units*. **Exceptions:**

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 90 percent of the *Accessible units*.
2. Roll-in-type showers shall be permitted to comply with assisted bathing requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 90 percent of the *Accessible units.*

1108.5.2.2 Type B units. In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*. **Exception:** The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

1108.5.3 Group I-2 hospitals. *Accessible units* and *Type B units* shall be provided in general-purpose *hospitals*, psychiatric *facilities* and *detoxification facilities* of Group I-2 occupancies in accordance with Sections 1108.5.3.1 and 1108.5.3.2.

1108.5.3.1 Accessible units. At least 10 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*.
Exception: Entry doors to *Accessible dwelling units* or *sleeping units* shall not be required to provide the maneuvering clearance beyo the latch side of the door.

1108.5.3.2 Type B units. In *structures* with four or more *dwelling units* or *sleeping units intended to be occupied as a residence*, every *dwelling unit* and *sleeping unit intended to be occupied as a residence* shall be a *Type B unit*. **Exception:** The number of *Type B units* is permitted to be reduced in accordance with Section 1108.7.

Revise as follows:

1108.5.4 Group I-2 rehabilitation facilities. In *hospitals* and rehabilitation *facilities* of Group I-2 occupancies that specialize in treating conditions that affect mobility, or units within either that specialize in treating conditions that affect mobility, 100 percent of the *dwelling units* and *sleeping units* shall be *Accessible units*. **Exceptions:**

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2~~, in not more than 50 percent of *Accessible units*.
2. Roll-in-type showers shall be permitted to comply with assisted bathing requirements in accordance with ICC A117.1 Section 611.7 ~~not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.3~~, in not more than 50 percent of *Accessible units*.

Delete without substitution:

~~**1110.2.2 Water closets designed for assisted toileting.** Water closets designed for assisted toileting shall comply with Sections 1110.2.2.1 through 1110.2.2.6.~~

~~**1110.2.2.1 Location.** The centerline of the water closet shall be not less than 24 inches (610 mm) and not greater than 26 inches (660 mm) from one side of the required clearance.~~

~~**1110.2.2.2 Clearance.** Clearance around the water closet shall comply with Sections 1110.2.2.2.1 through 1110.2.2.2.3.~~

~~**1110.2.2.2.1 Clearance width.** Clearance around a water closet shall be not less than 66 inches (1675 mm) in width, measured~~

perpendicularly from the side of the clearance that is not less than 24 inches (610 mm) and not greater than 26 inches (660 mm) from the water closet centerline.

1110.2.2.2.2 Clearance depth. Clearance around the water closet shall be not less than 78 inches (1980 mm) in depth, measured perpendicularly from the rear wall

1110.2.2.2.3 Clearance overlap. The required clearance around the water closet shall permit overlaps per ICC A117.1, Section 604.3.3

1110.2.2.3 Height. The height of the water closet seats shall comply with ICC A117.1, Section 604.4.

1110.2.2.4 Swing-up grab bars. Swing-up grab bars shall comply with ICC A117.1, Sections 609.2 and 609.8. Swing-up grab bars shall be provided on both sides of the water closet and shall comply with all of the following:

1. The centerline of the grab bar shall be not less than 14 inches (356 mm) and not greater than 16 inches (405 mm) from the centerline of the water closet.
2. The length of the grab bar is not less than 36 inches (915 mm) in length, measured from the rear wall to the end of the grab bar.
3. The top of the grab bar in the down position is not less than 30 inches (760 mm) and not greater than 34 inches (865 mm) above the floor.

1110.2.2.5 Flush controls. Flush controls shall comply with ICC A117.1, Section 604.6.

1110.2.2.6 Dispensers. Toilet paper dispensers shall be mounted on at least one of the swing-up grab bars and the outlet of the dispenser shall be located not less than 24 inches (610 mm) and not greater than 36 inches (915 mm) from the rear wall.

1110.2.3 Standard roll-in-type shower compartment designed for assisted bathing. Standard roll-in-type shower compartments designed for assisted bathing shall comply with Sections 1110.2.3.1 through 1110.2.3.9.

1110.2.3.1 Size. Standard roll-in-type shower compartments shall have a clear inside dimension of not less than 60 inches (1525 mm) in width and 30 inches (760 mm) in depth, measured at the center point of opposing sides. An entry not less than 60 inches (1525 mm) in width shall be provided.

1110.2.3.2 Clearance. A clearance of not less than 60 inches (1525 mm) in length adjacent to the 60-inch (1525 mm) width of the open face of the shower compartment, and not less than 30 inches (760 mm) in depth, shall be provided. **Exceptions:**

1. A lavatory complying with ICC A117.1, Section 606 shall be permitted at one end of the clearance.
2. Where the shower compartment exceeds minimum sizes, the clear floor space shall be placed adjacent to the grab bars and not less than 30 inches (762 mm) from the back wall.

1110.2.3.3 Grab bars. Grab bars shall comply with ICC A117.1, Section 609 and shall be provided in accordance with Sections 1110.2.3.3.1 and 1110.2.3.3.2. In standard roll-in-type shower compartments, grab bars shall be provided on three walls. Where multiple grab bars are used, required horizontal grab bars shall be installed at the same height above the floor. Grab bars can be separate bars or one continuous bar.

1110.2.3.3.1 Back-wall grab bar. The back-wall grab bar shall extend the length of the back wall and extend within 6 inches (150 mm) maximum from the two adjacent sidewalls. **Exception:** The back-wall grab bar shall not be required to exceed 48 inches (1220 mm) in length. The rear grab bar shall be located with one end within 6 inches maximum of a sidewall with a grab bar complying with Section 1110.2.3.3.2.

~~**1110.2.3.3.2 Sidewall grab bars.** The sidewall grab bars shall extend the length of the wall and extend within 6 inches (150 mm) of the adjacent back wall. **Exceptions:**~~

1. ~~The sidewall grab bar shall not be required to exceed 30 inches (760 mm) in length. The side grab bar shall be located with one end within 6 inches (152 mm) of the back wall with a grab bar complying with Section 1110.2.3.3.1.~~
2. ~~Where the sidewalls are located 72 inches (1830 mm) or greater apart, a grab bar is not required on one of the sidewalls.~~

~~**1110.2.3.4 Seats.** Wall-mounted folding seats shall not be installed.~~

~~**1110.2.3.5 Controls and hand showers.** In standard roll-in-type showers, the controls and hand shower shall be located not less than 38 inches (965 mm) and not greater than 48 inches (1220 mm) above the shower floor. Controls shall be located to facilitate caregiver access.~~

~~**1110.2.3.6 Hand showers.** Hand showers shall comply with ICC A117.1, Section 608.5.~~

~~**1110.2.3.7 Thresholds.** Thresholds shall comply with ICC A117.1, Section 608.6.~~

~~**1110.2.3.8 Shower enclosures.** Shower compartment enclosures for shower compartments shall comply with ICC A117.1, Section 608.7.~~

~~**1110.2.3.9 Water temperature.** Water temperature shall comply with ICC A117.1, Section 608.8.~~

Reason: The next edition of ICC A117.1 will include requirements for assisted toileting and bathing in Section 611. This proposal was 06-84-2021. Information can be viewed on the ICC A117.1 webpage at https://www.iccsafe.org/icc-asc-a117-1/. These provisions include several improvements to the text currently in the IBC. This section should be deleted from the IBC and reference the appropriate sections in the ICC A117.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These requirements are being replaced with similar requirements in the next edition of ICC A117.1. There scoping will remain the same for this option.

E122-24

Public Hearing Results (CAH1)

Errata: This proposal includes unpublished errata in the following sections of the IBC.
1108.5.1.1 Accessible units. In Group I-1, Condition 1, at least 4 percent, but not less than one, of the dwelling units and sleeping units shall be Accessible units. Accessible dwelling units and sleeping units shall be dispersed among the various classes of units.
Exceptions:
1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 in not more than 50 percent of the Accessible units.
2. Roll-in-type showers shall be permitted to comply with assisted ~~toileting~~ bathing requirements in accordance with ICC A117.1 Section 611.7 in not more than 50 percent of the Accessible units.

1108.5.1.2 Accessible units in Group I-1, Condition 2. In Group I-1, Condition 2, at least 10 percent, but not less than one, of the dwelling units and sleeping units shall be Accessible units. Accessible dwelling units and sleeping units shall be dispersed among the

various classes of units.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611, in not more than 50 percent of the Accessible units.
2. Roll-in-type showers shall be permitted to comply with assisted ~~toileting~~ bathing requirements in accordance with ICC A117.1 Section 611.7 in not more than 50 percent of the Accessible units.

1108.5.2.1 Accessible units. At least 50 percent but not less than one of each type of the dwelling units and sleeping units shall be Accessible units.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 in not more than 90 percent of the Accessible units.
2. Roll-in-type showers shall be permitted to comply with assisted ~~toileting~~ bathing requirements in accordance with ICC A117.1 Section 611.7 in not more than 90 percent of the Accessible units.

1108.5.4 Group I-2 rehabilitation facilities. In hospitals and rehabilitation facilities of Group I-2 occupancies that specialize in treating conditions that affect mobility, or units within either that specialize in treating conditions that affect mobility, 100 percent of the dwelling units and sleeping units shall be Accessible units.

Exceptions:

1. Water closets shall be permitted to comply with assisted toileting requirements in accordance with ICC A117.1 Section 611 in not more than 50 percent of Accessible units.
2. Roll-in-type showers shall be permitted to comply with assisted ~~toileting~~ bathing requirements in accordance with ICC A117.1 Section 611.7 in not more than 50 percent of Accessible units.

Committee Action: **Disapproved**

Committee Reason: These criteria should not be deleted until the next edition of the ICC A117.1 is finalized. (Vote: 12-0)

E122-24

Individual Consideration Agenda

Comment 1:

Proponents: Gene Boecker, CCI, self (geneb@codeconsultants.com); Matt Lescher, CCI, self (mattl@codeconsultants.com) requests As Submitted

Reason: BOECKER: The only reason offered by the committee was that these items should not be deleted until the A117.1 is finalized. There were no technical objections. A request to approve as originally submitted is offered to keep this item "alive."

This particular portion of the A117.1 has been reviewed and approved and is now a part of the final draft. As such, it's final form is complete. At the time of this submission in July, final votes on the content of the new A117.1 have not occurred. So, it is not possible to say that the A117.1 is a "next edition" yet. However, the timeline for inclusion in the 2027 IBC requires it to be published prior to the publication of the 2027 IBC, technically December 2026 although it should be a few months earlier for practical purposes. Also, from a practical perspective, the final active for Group A and B items will be at the public hearings from April 19-28, 2026. Even at the current pace, the A117.1 will be completed by then.

The committee has the option to either vote to approve As Submitted since the A117.1 will certainly be completed before the Public hearings in 2026 or to again vote to Disapprove and kick the can to the next round of public comments. My preference is to have fewer public comments in the future.

LESCHER: The reason that the code change was disapproved was: " These criteria should not be deleted until the next edition of the ICC A117.1 is finalized." The requirments for assisted toilet and bathing facilities has already been approved by the A117.1 Committee and will be in the next edition of the standard. The entire standard is anticipated to be completed by the end of 2026 at the latest.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 728

E123-24

IBC: 1108.6.2

Proposed Change as Submitted

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com); Jim Safranek, Safranek Group LLC, Self (jim@safranekgroup.com); Gene Boecker, CCI, self (geneb@codeconsultants.com); Marsha Mazz, United Spinal Association, United Spinal Association (mmazz@accessibility-services.com)

2024 International Building Code

Revise as follows:

1108.6.2 Group R-2. *Accessible units, Type A units* and *Type B units* shall be provided in Group R-2 occupancies in accordance with Sections 1108.6.2.1 through 1108.6.2.3. Where Group R-2 apartments will have dwelling units intended to also be Group R-1 occupancies, those units shall comply with Section 1108.6.1.

Reason: In the old days it was generally simple to distinguish the difference between an apartment building and a hotel building. However, in recent years as the demand for short term rentals has increased exponentially, many multifamily R-2 projects are being designed with a group of units where the intention is that they will be used for short term stays. In many instances, these units will be covered by the ADA and/or Fair Housing Act (FHA). One of the main objectives of Chapter 11 is to harmonize with the ADA and FHA requirements because the Building Official is charged with enforcing the IBC and does not otherwise have authority to enforce the ADA or FHA. There are many factors that must be considered when determining the application of the ADA and FHA, such as ownership, management, length of stays, etc., but we have attempted to provide some generalizations in order to simplify and capture some of the major concerns.

If these units will be available to be rented by the general public, it is likely that they will be covered by the ADA as transient lodging. Similar to hotels, this code change proposal requires compliance with the R-1 requirements of Section 1108.6.1. Accessible units will be required in accordance with Table 1108.6.1.1. Per Section 1108.6.1.2, the remaining units will be required to be Type B if they are intended to be occupied as a residence to meet the requirements of the Fair Housing Act (FHA), if these units will only function for short term stays, like a standard hotel, then the remaining units would not be Type B.

If these units will only be available as an amenity for residents and will not be available for rental by the general public, then it is unlikely that the ADA will apply to these units. However, the units will likely be covered by the FHA. While covered by the FHA, the FHA safe harbor documents do not state how they should be addressed. Requiring compliance with Section 1108.6.1 will cover this concern. Fully accessible units will be required per Table 1108.6.1.1 and the determination for Type B is whether or not these units are intended to be occupied as a residence.

In this proposal, the term apartment houses was used for consistency with the other applicable sections for R-2. As such, it is intended to cover both apartment houses and condominiums.

There will be times where there is no way to know how certain units will be used in the future. Therefore, designers, Building Officials, owners, and other interested parties, must use the best information available at that time when applying these requirements.

Another goal of this proposal is to avoid future litigation as these short term rentals are covered by the ADA and FHA and must provide accessibility to people with disabilities.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

In our opinion, this proposal is a clarification for how the requirements should be applied to short term rental units. These units do not function as standard apartment/condominium units and should be classified as R-1 units, not as R-2 where the occupancy is longer than 30 days.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This is already addressed in Chapter 3 for all buildings used for two purposes. A change of occupancy can be address through enforcement. (Vote: 11-1)

E123-24

Individual Consideration Agenda

Comment 1:

IBC: 1108.6.2

Proponents: Matt Lescher, CCI, self (mattl@codeconsultants.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

1108.6.2 Group R-2. *Accessible units, Type A units* and *Type B units* shall be provided in Group R-2 occupancies in accordance with Sections 1108.6.2.1 through 1108.6.2.3. Where Group R-2 ~~apartments~~ apartment houses will have dwelling units or sleeping units intended to also be used on a transient basis ~~Group R-1 occupancies~~, the ~~those~~ units intended for transient purposes shall comply with ~~Section~~ Sections 302.1 and1108.6.1.

Reason: The revised proposal addresses the reason for disapproval by incorporating Section 302.1. The modification removed the reference to R-1 occupancies because there are many times where the Authority Having Jurisdiction will allow the units to be classified as R-2, however, in doing so, the building would not comply with the ADA and/or FHA unless the short term rental units are subject to the unit counts for fully accessible units.

Bibliography: Report from the Rocky Mountain ADA Center

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This requirement is a clarification. Where units are provided for use on a transient basis, compliance with Table 1108.6.2.1 should have already been required, either because the units should be classified as R-1, or because they should comply with Section 1108.2.3. Further, the federal ADA and associated 2010 Standards and/or the FHA require these units include fully accessible, so an argument that this increases construction costs would be based on a building that is not built in compliance with federal accessibility laws.

Comment (CAH2)# 402

E127-24 Part I

IBC: SECTION 202 (New), 1110.4.2, IAPMO (New)

Proposed Change as Submitted

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART II WILL BE HEARD BY THE PLUMBING/PRIVATE SEWAGE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

ADULT CHANGING STATIONS. An *assistive table* and the associated maneuvering clearances.

ASSISTIVE TABLE. A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

1110.4 Adult changing stations. Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with Sections 1110.4.1 through 1110.4.4.

1110.4.1 Where required. Not fewer than one adult changing station shall be provided in the following locations:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1.
2. In Group B occupancies providing educational *facilities* for students above the 12th grade, where an aggregate of 12 or more male and female water closets are required to serve the classrooms and lecture halls.
3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

Revise as follows:

1110.4.2 Room. Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. The assistive tables shall comply with IAPMO Z1390. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied. **Exception:** Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

1110.4.3 Prohibited location. The *accessible route* from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

1110.4.4 Travel distance. The adult changing station shall be located on an *accessible route* such that a *person* is not more than two *stories* above or below the *story* with the adult changing station and the path of travel to such *facility* shall not exceed 2,000 feet (609.6 m).

Add new standard(s) as follows:

IAPMO Z1390-20XX. Assistive Tables

Reason: Assistive tables are plumbing products that facilitate and support the personal hygiene of individuals who are physically challenged, disabled, or elderly. While the assistive table is not a new product, the products are required in new commercial buildings and substantial renovations of existing bathrooms in Arkansas, Arizona, California, New Hampshire, and Pennsylvania. Massachusetts, Michigan, Minnesota, and Wisconsin have pending legislation for these products. A technical subcommittee of manufacturers, consultants, installers, and disability experts wrote the product performance and safety standard, IAPMO Z1390 Assistive Tables. IAPMO Z1390 covers 1) product design requirements for user weight, maximum loads, heights, operation, locking safety mechanisms, mechanical wear, cleaning and disinfection, changing surface, grab rails, safety restraint systems, electrical, support structure, integrated plumbing fittings, integrated plumbing fixtures, 2) performance requirements for height, vertical movement, locking mechanisms, changing surface tests, grab bars, support structures, waste fitting connections, and body part entrapment, 3) marking and signage requirements, and 4) installation documentation.

Bibliography: IAPMO Z1390 Assistive Tables

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. Laboratory testing and third-party certification fees for products typically range between $3,000 to $20,000. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

Estimated Immediate Cost Impact Justification (methodology and variables):

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

E127-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because while a safety standard for adult changing tables are important, the IAPMO Z1390 is not yet finalized. (Vote: 10-4)

E127-24 Part I

Individual Consideration Agenda

Comment 1:

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com) requests As Submitted

Reason: *IAPMO Z1390 Assistive Tables* standard was published on July 8, 2024. The publication of the safety standard addresses the Committee's concern.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

NOTE: E127-24 PART II DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

E127-24 Part II

IPC: SECTION 202 (New), SECTION 427 (New), 427.1 (New), 427.1.1 (New), 427.1.2 (New), 427.1.3 (New), 427.1.4 (New), IAPMO (New)

Proposed Change as Submitted

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

2024 International Plumbing Code

Add new definition as follows:

ADULT CHANGING STATIONS. An *assistive table* and the associated maneuvering clearances.

ASSISTIVE TABLE. A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

Add new text as follows:

SECTION 427
ASSISTIVE TABLES

427.1 Adult changing stations.. Where provided, adult changing stations shall be accessible. Where required, adult changing stations shall be accessible and shall comply with Sections 427.1.1 through 427.1.4.

427.1.1
Where required
. Not fewer than one adult changing station shall be provided in the following locations:

1. In assembly and mercantile occupancies, where family or assisted-use toilet or bathing rooms are required to comply with Section 1110.2.1 of the International Building Code.
2. In Group B occupancies providing educational *facilities* for students above the 12th grade, where an aggregate of 12 or more male and female water closets are required to serve the classrooms and lecture halls.
3. In Group E occupancies, where a room or space used for assembly purposes requires an aggregate of six or more male and female water closets for that room or space.
4. In highway rest stops and highway service plazas.

427.1.2 Room. Adult changing stations shall be located in toilet rooms that include only one water closet and only one lavatory. The assistive tables shall comply with IAPMO Z1390. Fixtures located in such rooms shall be included in determining the number of fixtures provided in an occupancy. The occupants shall have access to the required adult changing station at all times that the associated occupancy is occupied. **Exception:** Adult changing stations shall be permitted to be located in family or assisted toilet rooms required in Section 1110.2.1.

427.1.3 Prohibited location. The *accessible route* from separate-sex toilet or bathing rooms to an accessible adult changing station shall not require travel through security checkpoints.

427.1.4 Travel distance. The adult changing station shall be located on an *accessible route* such that a *person* is not more than two *stories* above or below the *story* with the adult changing station and the path of travel to such *facility* shall not exceed 2,000 feet (609.6 m).

IAPMO Z1390-20XX. Assistive Tables

Reason: Assistive tables are plumbing products that facilitate and support the personal hygiene of individuals who are physically challenged, disabled, or elderly. While the assistive table is not a new product, the products are required in new commercial buildings and substantial renovations of existing bathrooms in Arkansas, Arizona, California, New Hampshire, and Pennsylvania. Massachusetts, Michigan, Minnesota, and Wisconsin have pending legislation for these products. A technical subcommittee of manufacturers, consultants, installers, and disability experts wrote the product performance and safety standard, IAPMO Z1390 Assistive Tables. IAPMO Z1390 covers 1) product design requirements for user weight, maximum loads, heights, operation, locking safety mechanisms, mechanical wear, cleaning and disinfection, changing surface, grab rails, safety restraint systems, electrical, support structure, integrated plumbing fittings, integrated plumbing fixtures, 2) performance requirements for height, vertical movement, locking mechanisms, changing surface tests, grab bars, support structures, waste fitting connections, and body part entrapment, 3) marking and signage requirements, and 4) installation documentation.

Bibliography: IAPMO Z1390 Assistive Tables

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. Laboratory testing and third-party certification fees for products typically range between $3,000 to $20,000. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

Estimated Immediate Cost Impact Justification (methodology and variables):

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

E127-24 Part II

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee agreed with the published reason statement. (Vote: 10-3)

E127-24 Part II

RM1-24

IRC: M1305.1.2, M1305.1.2.2 (New)

Proposed Change as Submitted

Proponents: David Crawford Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org)

2024 International Residential Code

M1305.1.2 Appliances in attics. *Attics* containing *appliances* shall be provided with an opening and a clear and unobstructed passageway large enough to allow removal of the largest *appliance*, but not less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the *appliance*. The passageway shall have continuous solid flooring in accordance with Chapter 5 not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the *appliance* where access is required. The clear access opening dimensions shall be not less than of 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest *appliance*. **Exceptions:**

1. The passageway and level service space are not required where the *appliance* can be serviced and removed through the required opening.
2. Where the passageway is unobstructed and not less than 6 feet (1829 mm) high and 22 inches (559 mm) wide for its entire length, the passageway shall be not more than 50 feet (15 250 mm) long.

Add new text as follows:

M1305.1.2.2 Permanent service access. For new construction, a permanent means of access without the use of a portable ladder shall be provided in order to comply with M1305.1. Such means shall include the use of either pulldown stairs or other permanent steps acceptable to the code official. **Exception:** Existing construction.

Reason: Section M1305.1.2 provides specifications for the size of the minimum clear and unobstructed opening and passageway to allow removal of the largest appliance. However, the need for a safe and secure energy efficient access is not specified and should be added for the safety of personnel and consumers. For consumers, replacement of HVAC filters is recommended maintenance and access to the attic should be as safe as possible. ACCA believes that there is an urgent need for new homes to be constructed to take care of future service, repair, replacement and overall general safety for all including the homeowner, contractors, insurance representatives, regular structural pest control inspections, especially first responders and anyone else who may need to access to this part of the home in the future. The exception limits the proposal to new construction only. ACCA is not suggesting that existing homes anywhere in the country change their access to a stair/ladder access when they change their heating and cooling equipment or any other items in their attics. The proposal is similar to an amendment to the Georgia building code that became effective January 1, 2020.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The code change proposal **will increase** the cost of construction. It is estimated that attic stairs/ladders may add $250-$350 to a new home cost, but the savings in safety over time is significantly overcome and justified.

Estimated Immediate Cost Impact Justification (methodology and variables):

A range of costs was determined based on surveying available pull-down attic stairs that are widely available in the marketplace.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of this proposal 9-1. The reason provided was that the cost estimate was way off, as the requirement to add insulation was not factored in. In addition to the inaccurate cost estimate, additional arguments suggest that these stairs take up a lot of space. The example given was the use of these stairs in townhomes without having the required room to properly use the stairs in halls or closets. The continued discussion noted that the practicality of the proposal simply does not work. There is also no standard available for ladders to be installed per this proposed application.

RM1-24

Individual Consideration Agenda

Comment 1:

IRC: M1305.1.2, M1305.1.2.2 , M1305.1.2.3 (New)

Proponents: David Bixby, Air Conditioning Contractors of America (ACCA), ACCA (david.bixby@acca.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Residential Code

M1305.1.2 Appliances in attics. *Attics* containing *appliances* shall be provided with an opening and a clear and unobstructed passageway large enough to allow removal of the largest *appliance*, but not less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the *appliance*. The passageway shall have continuous solid flooring in accordance with Chapter 5 not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the *appliance* where access is required. The clear access opening dimensions shall be not less than of 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest *appliance*. **Exceptions:**

1. The passageway and level service space are not required where the *appliance* can be serviced and removed through the required opening.
2. Where the passageway is unobstructed and not less than 6 feet (1829 mm) high and 22 inches (559 mm) wide for its entire length, the passageway shall be not more than 50 feet (15 250 mm) long.

M1305.1.2.2 Permanent service access. For new construction, a permanent means of access without the use of a portable ladder shall be provided in order to comply with M1305.1. Such means shall include the use of either pulldown stairs or other permanent steps acceptable to the code official.

Exception: Existing construction.

Add new text as follows:

M1305.1.2.3 Pulldown Stairs Duty Rating. Pulldown stairs shall have a duty rating of not less than 350 lbs. and be installed according to the manufacturer's instructions.

Reason: Additional criteria is proposed which is similar to the City of Houston Mechanical Code requirements (305.2.3) for inside access of furnaces installed in attics. In addition, the Houston requirement specifies pulldown stairs having a rated load capacity of not less than 350 lbs. This capacity rating is covered under ANSI A14.9 – 2019, *Standard for Disappearing Attic Stairways*, as published by the American Ladder Institute (ALI). The scope of the standard is shown below.

SCOPE: This standard prescribes rules concerning the safe design, construction, testing, care, installation and use of permanently installed metal or wood, disappearing attic stairways of various types designed to be used for access to upper levels such as attics. Household units with duty ratings of 250, 300 and 350 lbs., or commercial units with a rating of 500 lbs. are the only units covered in this standard. This standard is not intended to apply to any attic stairway covered in any other ANSI A14 standards or disappearing attic stairways intended for use with ceiling heights in excess of 12 feet. This standard also prescribes rules and minimum requirements for installation instructions and labeling of disappearing attic stairways in order to promote safety under normal conditions of usage. This standard is not intended to cover requirements for fire separation that may be required by various building codes. It does not apply where training, supervision, or established safety procedures are in conflict with, or serve in lieu of, this standard.

Cost Impact: Increase

Estimated Immediate Cost Impact:

According to the website shown below, attic ladder installation costs range from $340 to $1,240, including labor and materials, while the average cost to install an attic ladder comes in at $490. The price to install an attic ladder depends on the ladder length, material, labor, permits, and more. https://www.bobvila.com/articles/attic-ladder-installation-cost/

Estimated Immediate Cost Impact Justification (methodology and variables):

See website link on methodology and variables: https://www.bobvila.com/articles/attic-ladder-installation-cost/

Comment (CAH2)# 555

RM2-24

IRC: M1401.1, ASHRAE Chapter 44 (New)

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Residential Code

Revise as follows:

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions and the requirements of this code. Heating and cooling equipment using a refrigeration system shall also be installed in accordance with ASHRAE 15.2.

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications

Reason: This code change proposal adds the reference to ASHRAE 15.2, the installation standard for residential air conditioning. This code change closes the hole that was created in the Code when ASHRAE 15 split its scope between standards 15 and 15.2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes will have no impact on the cost of construction. The equipment design of residential systems is covered by the product design standard, UL 60335-2-40. Additionally, installation instructions will be found in the installation manuals provided by the Original Equipment Manufacturers (OEMs). However, the reference to ASHRAE 15.2 is necessary, as it is now the required application standard for residential systems serving a single dwelling or sleeping unit.

RM2-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee voted to approve this proposal as submitted 6-5. The discussion centered around ASHRAE 15.2 being added in this code section for specific use of residential installations. The consensus for approval is that this standard is already included in manufacturers instructions.

RM2-24

Individual Consideration Agenda

Comment 1:

IRC: CHAPTER 14, SECTION M1401, M1401.1, SECTION M1411, M1411.1, M1411.2, M 1411.3

Proponents: Nathan Kahre, National Association of Home Builders (nkahre@nahb.org); Vladimir G. Kochkin, NAHB, NAHB (vkochkin@nahb.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

CHAPTER 14
HEATING AND COOLING EQUIPMENT AND APPLIANCES

SECTION M1401
GENERAL

Revise as follows:

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions and the requirements of this code. ~~Heating and cooling equipment using a refrigeration system shall also be installed in accordance with ASHRAE 15.2.~~
[No changes to sections M1402-M1410]

SECTION M1411
HEATING AND COOLING EQUIPMENT

M1411.1 Approved refrigerants. Refrigerants used in direct refrigerating systems shall conform to the applicable provisions of ANSI/ASHRAE 34.

M1411.2 Refrigeration system listing. Refrigeration systems using Group A2L refrigerants shall be *listed* and *labeled* to UL/CSA 60335-2-40. Manufacturer's installation instructions for refrigeration systems using Group A2L refrigerants shall be included in the listing and shall comply with the applicable requirements of UL/CSA 60335-2-40 and ASHRAE 15.2. Refrigeration systems using Group A1 refrigerants shall be *listed* to UL/CSA 60335-2-40 or UL 1995. The equipment shall be installed in accordance with the listing.

M 1411.3 Refrigeration system installation. Refrigeration systems shall be installed in accordance with the manufacturer's installation instructions. After installation, the manufacturer's installation instructions, owner's manuals, service manuals and any other product literature provided with the equipment shall be attached to the indoor unit or left with the homeowner.

Reason: This change achieves two goals:

- It locates the new installation requirements in the appropriate section for heating and cooling equipment (Section M1411)
- It updates the requirements to ensure that the new installation practices are included in the manufacturer's installation instructions

ASHRAE 15.2 is an engineering standard and the complex format of the information in ASHRAE 15.2 is not conducive to direct implementation in the field for residential construction. The only effective way to ensure that the new measures are implemented correctly in the field is to include the applicable information in the installation instructions.

The proposed revision ensures that installation instruction from all equipment manufacturers include the necessary measures and that these measures are consistent with the equipment safety features built into the equipment from the specific manufacturer. Most of the information in ASHRAE 15.2 will not apply to the standard equipment used for one- and two-family dwellings. All relevant information can

be easily and more effectively communicated via installation instructions resulting in more consistent implementation in the field and in better enforcement. Requiring the HVAC installers to retrieve a few bits of relevant information from ASHRAE 15.2 rather than rely on installation instructions is not a feasible strategy to roll out A2L refrigerants.

2024 IRC already includes key provisions for addressing A2L refrigerants in Section M1411. The language that was added by RM2 at the April committee hearings (CAH1) causes duplication of requirements with Section M1411. The proposed change resolves this conflict and offers the optimum balance between the requirements of the IRC provisions and the installation instructions. In addition, this format will allow manufacturers to update their installation instructions as ASHRAE 15.2 gets updated on a continuous cycle.

Moreover, the transition to A2Ls has already begun and is required by law to be complete years before 2027 IRC will begin to be adopted and implemented by jurisdictions. The only way this transition can be successfully implemented if all applicable requirements are addressed through the installation instructions on day one as the new equipment arrives on job sites around the country. The IRC should provide a path that reflects the most effective practice for equipment installation and inspection. Having multiple compliance documents on the job site will lead to counterproductive outcomes.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The transition to A2L refrigerants will increase cost of construction due to additional costs for new equipment and new refrigerants. However, the proposed modification seeks to consolidate installation requirements into a single document and gain efficiencies in installation and inspections processes, which can lead to mitigating effects on the cost impact. The expected cost decrease will come from savings of time installers and code officials would otherwise need to spend on reviewing, understanding, and coordinating installation requirements from different documents.

At the time of submitting this comment, ASHRAE 15. 2 costs $105 but it's expected that ASHRAE will post 15.2 for access free of charge.

Estimated Immediate Cost Impact Justification (methodology and variables):

The key variable is the time needed for installers and code officials to ensure that manufacturer's installation instructions comply with an engineering standard (ASHRAE 15.2). Because ASHRAE 15.2 is a complex engineering document, additional time will be required to determine which provisions apply and how these provisions apply to the specific equipment and its installation and resolving any differences with installation instructions.

Comment (CAH2)# 204

Comment 2:

IRC: SECTION R202, SECTION 202 (New), CHAPTER 14, SECTION M1401, M1401.1, SECTION M1411, M1411.6, ASHRAE Chapter 44

Proponents: Greg Johnson, Johnson & Associates Consulting Services, National Multifamily Housing Council (gjohnsonconsulting@gmail.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

SECTION R202
DEFINITIONS

Add new definition as follows:

[MP] REFRIGERANT LEAK DETECTION SYSTEM. A system, installed by the manufacturer or installed in accordance with the manufacturer's instructions, capable of sensing and responding to a refrigerant leak.

CHAPTER 14
HEATING AND COOLING EQUIPMENT AND APPLIANCES

SECTION M1401
GENERAL

M1401.1 Installation. Heating and cooling *equipment* and *appliances* shall be installed in accordance with the manufacturer's instructions and the requirements of this code. ~~Heating and cooling equipment using a refrigeration system shall also be installed in accordance with ASHRAE 15.2.~~

SECTION M1411
HEATING AND COOLING EQUIPMENT

M1411.6 Refrigerant charge. Refrigeration systems shall have refrigerant charge in compliance with the equipment manufacturer's installation instructions and the requirements of the listing. Group A2L refrigerant charge for an individual refrigeration system shall not exceed ~~34.5~~ 35.1 pounds (~~15.7~~ 15.9 kg).Refrigerant charge for Group A2L refrigeration systems that do not have a *refrigerant leak detection system* shall also be in accordance with ASHRAE 15.2.

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

15.2-2022 Safety Standard for Refrigeration Systems in Residential Applications

Reason: Refrigerant leak detection systems have been selected by HVAC original equipment manufacturers as the primary risk mitigation measure for heating and cooling systems with A2L refrigerants in one- and two-family dwellings. Centralized A/C and heat pump systems and many mini-split systems will incorporate a refrigerant leak detection system. The refrigerant charge limit for equipment with a refrigerant leak detection system is much higher than IRC-compliant installations will require, simplifying compliance requirements.

The proposed change reserves ASHRAE 15.2 for equipment that is employing mitigation methods other than a refrigerant leak detection system. The proposed modification requires that the amount of refrigerant charge installed in such equipment is determined in accordance with ASHRAE 15.2. This determination of compliance with ASHRAE 15.2 can also be accomplished via manufacturer's installation instructions, yet the proposed language creates an additional pointer for installers and code officials to consult where needed.

UL 60355-2-40 – the required listing standard for this equipment – includes requirements for both functions of a refrigerant leak detection system: (1) refrigerant detection and (2) appropriate mitigation actions. A definition of Refrigerant Leak Detection System is also added to IRC to complement the proposed provisions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification to RM2-24 is intended to improve coordination between IRC provisions and ASHRAE 15.2 and to simplify compliance.

Comment (CAH2)# 620

RM5-24

IRC: SECTION 202, M1413.1, CHAPTER 15, SECTION M1502, M1502.3, SECTION M1504, M1504.3, M1602.1

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2024 International Residential Code

[MP] LIVING SPACE. Space within a *dwelling unit* utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes. For the definition applicable in Chapter 11, see Section N1101.6. For the definition applicable in Chapter 24, see Section G2403.

Revise as follows:

M1413.1 General. Evaporative cooling *equipment* and *appliances* shall comply with UL 1995 or UL/CSA 60335-2-40, and shall be installed:

1. In accordance with the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.3.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.4.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that outdoor air intake opening locations are in accordance with Section R325.4.1.

CHAPTER 15
EXHAUST AND VENTILATION SYSTEMS

SECTION M1502
CLOTHES DRYER EXHAUST

Revise as follows:

M1502.3 Duct termination. Exhaust ducts shall terminate on the outside of the *building*. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into *buildings*, including openings in ventilated soffits. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Exhaust air shall not be directed onto walkways.

SECTION M1504
VENTILATION SUPPLY DUCTS, LIVING SPACE EXHAUST DUCTS, AND LIVING SPACE EXHAUST TERMINATIONS ~~OPENINGS~~

M1504.3 Location of ~~E~~exhaust terminations serving living spaces~~openings.~~ Exhaust air shall not be directed onto walkways. ~~Air exhaust openings shall terminate~~ Exhaust terminations serving dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling unit living spaces shall be located as follows:

1. Not less than 3 feet (914 mm) from property lines.

2. Not less than 3 feet (914 mm) from gravity outdoor air intake openings, operable windows and doors except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical outdoor air intake openings except where either of the following apply:
   3.1. The exhaust termination ~~opening~~ is located not less than 3 feet (914 mm) above the air intake opening.
   3.2. The exhaust termination ~~opening~~ is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a *living space*.
4. ~~In accordance with Sections R303.5.2 and R303.6.~~

M1505.4 Exhaust termination protection. Exhaust terminations serving dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling unit living spaces shall be protected with corrosion-resistant screens, louvers, or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Exhaust terminations shall be protected against local weather conditions.

M1602.1 Outdoor air intake openings. Outdoor air intake openings shall be located in accordance with Section R~~325.4.1~~303.5.1. Opening protection shall be in accordance with Section R~~325.5~~303.6.

Reason: In the 2009/2010 cycle, Section M1504.3 was formed through proposal RM12-09/10 based on the rationale that outdoor air intake openings should be addressed in Chapter 3 and that exhaust terminations should be addressed elsewhere. After multiple cycles, the language has become muddled, and modifications are needed to clarify the intent. This proposal does the following:

1. Uses the term "outdoor air intake opening" where referenced in Chapters 14, 15, and 16, consistent with the language in R303.5.1.

2. Uses consistent terminology when referring to "exhaust terminations," "clothes dryer exhaust duct terminations," and "vent and chimney terminations."

3. Moves the R303.5.2 prohibition for directing exhaust onto walkways to Sections M1504.3 and M1502.3, which address exhaust termination locations for exhaust air from living spaces and exhaust air from clothes dryers, respectively. Note that Table G2427.8 (503.8) already prohibits appliance vent terminations from being located above public walkways.

4. Moves the R303.6 requirements for exhaust termination protection to Section M1504.4, as this only applies to exhaust terminations that serve dwelling-unit toilet rooms, bathrooms, kitchens, and other dwelling-unit living spaces.

5. Modifies the titles for various sections to align with the material contained in those sections.

To coordinate these modifications with Sections R303.5 and R303.6 of the IRC, a companion proposal is planned for the Group B hearings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of existing requirements.

RM5-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of this proposal 10-0. The consensus of the committee is that the sections referenced for M1413.1 are not correct and that the proposed code language as written for section M1502.3 is limited to how exhaust air

should be erected on sidewalks. The committee suggests this specific code language proposed would be more conducive of being added to the IRC.

RM5-24

Individual Consideration Agenda

Comment 1:

IRC: SECTION 202, M1413.1, CHAPTER 15, SECTION M1502, M1502.3, M1502.3.1, M1502.4.6, M1502.4.6.1, SECTION M1504, M1504.1, M1504.2, M1504.3, M1504.4 (New), M1505.1, M1505.2, M1505.3, M1602.1, TABLE M1505.5

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Residential Code

[MP] LIVING SPACE. Space within a *dwelling unit* utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes. For the definition applicable in Chapter 11, see Section N1101.6. For the definition applicable in Chapter 24, see Section G2403.

M1413.1 General. Evaporative cooling *equipment* and *appliances* shall comply with UL 1995 or UL/CSA 60335-2-40, and shall be installed:

1. In accordance with the manufacturer's instructions.
2. On level platforms in accordance with Section M1305.1.3.1.
3. So that openings in exterior walls are flashed in accordance with Section R703.4.
4. So as to protect the potable water supply in accordance with Section P2902.
5. So that outdoor air intake opening locations are in accordance with Section R325.4.1.

CHAPTER 15
EXHAUST AND VENTILATION SYSTEMS

SECTION M1502
CLOTHES DRYER EXHAUST

M1502.3 ~~Duct~~ Exhaust termination. Exhaust ducts shall terminate on the outside of the *building*. Exhaust ~~duct~~ terminations shall be in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify an exhaust termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into *buildings*, including openings in ventilated soffits. Exhaust ~~duct~~ terminations shall be equipped with a backdraft damper. Screens shall not be installed at the ~~duct~~ exhaust termination. Exhaust air shall not be directed onto walkways.

M1502.3.1 Exhaust termination outlet and passageway size. The passageway of dryer exhaust ~~duct terminals~~terminations shall be undiminished in size and shall provide an open area of not less than 12.5 square inches (8065 mm^2).

M1502.4.6 Duct length. The maximum allowable exhaust duct length shall be determined by one of the methods specified in Sections M1502.4.6.1 through M1502.4.6.3.

M1502.4.6.1 Specified length. The maximum length of the exhaust duct shall be 35 feet (10 668 mm) from the connection to the transition duct from the dryer to the ~~outlet terminal~~exhaust termination. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table M1502.4.6.1. The maximum length of the exhaust duct does not include the transition duct.

SECTION M1504
~~EXHAUST~~ VENTILATION DUCTS AND EXHAUST ~~OPENINGS~~TERMINATIONS

M1504.1 Duct construction. Where ~~exhaust~~ ventilation duct construction is not specified in this chapter, construction shall comply with Chapter 16.

M1504.2 Duct length. The length of exhaust and supply ducts used with ventilating *equipment* shall not exceed the lengths determined in accordance with Table M1504.2. **Exception:** Duct length shall not be limited where the *duct system* complies with the manufacturer's design criteria or where the airflow rate of the installed ventilating *equipment* is verified by the installer or *approved* third party using integrated diagnostic equipment, a flow hood, flow grid, or other airflow measuring device.

M1504.3 Exhaust termination location ~~openings~~. Exhaust air shall not be directed onto walkways. ~~Air exhaust openings shall terminate~~ Exhaust terminations serving *living spaces*, *attics*, or *crawl spaces* shall be located as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity outdoor air intake openings, operable windows and doors except where the exhaust opening is located not less than 1 foot (305 mm) above the gravity air intake opening, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical outdoor air intake openings except where either of the following apply:
   3.1. The exhaust termination ~~opening~~ is located not less than 3 feet (914 mm) above the outdoor air intake opening.
   3.2. The exhaust termination ~~opening~~ is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the fan manufacturer's instructions, and the exhaust air is drawn from a *living space*.
4. ~~In accordance with Sections R303.5.2 and R303.6.~~

Add new text as follows:

M1504.4 Exhaust termination protection. Exhaust terminations shall meet the provisions for exterior wall opening protectives in accordance with this code. Exhaust terminations shall be protected with corrosion-resistant screens, louvers or grilles having an opening size of not less than ¼ inch (6 mm) and a maximum opening size of ½ inch (13 mm), in any dimension. Exhaust terminations shall be protected against local weather conditions. **Exception:** Screens, louvers, or grilles shall not be required for exhaust terminations serving *clothes dryers* or for *v*ent and chimney terminals serving fuel-burning *appliances* or *fireplaces*.

M1505.1 General. Where *local exhaust* or whole-house mechanical *ventilation* is provided, the ventilation system shall be designed in accordance with this section. Ventilation ducts shall comply with Section M1504.

M1505.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and *kitchens* shall not discharge into an *attic*, *crawl space* or other areas inside the *building*. This section shall not prohibit the installation of ductless range hoods in accordance with the exception to Section M1503.3. **Exception:** Recirculation of exhaust air within a single *dwelling unit* shall be permitted during temporary defrost operation of a heat recovery ventilator or energy recovery ventilator.

M1505.3 ~~Exhaust~~ Ventilating equipment listings. Exhaust fans and whole-house mechanical ventilation fans shall be *listed* and *labeled* for airflow ~~as providing the minimum required airflow~~ based on laboratory testing in accordance with ANSI/AMCA 210-ANSI/ASHRAE

51 or HVI 916.
The *listed* airflow shall meet or exceed the airflow required by Section M1505.4.3 and Section M1505.5, as applicable, at not less than one speed setting.

M1602.1 Outdoor air intake openings. Outdoor air intake openings shall be located in accordance with Section R325.~~4~~3.1. Opening protection shall be in accordance with Section R325.~~5~~4.

TABLE M1505.5 MINIMUM REQUIRED LOCAL EXHAUST RATES ~~FOR ONE- AND TWO-FAMILY DWELLINGS~~

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	~~Mechanical exhaust capacity of~~ 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 inch water column = 0.2488 kPa.

Reason: In the 2009/2010 cycle, Section M1504.3 was formed through proposal RM12-09/10 based on the rationale that outdoor air intake openings should be addressed in Chapter 3 and that exhaust terminations should be addressed elsewhere. After multiple cycles, the language has become muddled, and modifications are needed to clarify the intent. This proposal does the following:

1. Uses the term "outdoor air intake opening" where referenced in Chapters 14, 15, and 16, consistent with the language in R325.4.1.
2. Uses consistent terminology when referring to "exhaust terminations," "clothes dryer exhaust duct terminations," and "vent and chimney terminations."
3. Moves the R325.4.2 prohibition for directing exhaust onto walkways to Sections M1504.3 and M1502.3, which address exhaust termination locations for exhaust air from living spaces and exhaust air from clothes dryers, respectively. Note that Table G2427.8 (503.8) already prohibits appliance vent terminations from being located above public walkways.
4. Moves the R325.5 requirements for exhaust termination protection to Section M1504.4, as this only applies to exhaust terminations that serve living spaces, not exhaust terminations that serve clothes dryers or vent and chimney terminations.
5. Modifies the titles for various sections to align with the material contained in those sections.

Specific rationale for modifications to certain sections follows:

M1504.2 Exception: Integrated diagnostic equipment is recognized by Section 403.6.3 of the 2024 IECC-R for field verification of ventilation airflow rates, and it should also be recognized here for consistency.

M1505.1: A cross reference to Section M1504 is proposed to ensure that the duct requirements are not overlooked.

M1505.2: Adding an exception for recirculation defrost operation of HRVs and ERVs (collectively, HERVs) is needed to ensure that recirculation defrost is permitted temporarily within a single dwelling unit when needed to maintain HERV operation under very cold conditions. Recirculation defrost is likely the most common method for controlling defrost in unitary HERVs.

M1505.3: Clarification is needed to communicate that the airflows required are not provided by ANSI/AMCA 210-ANSI/ASHRAE 51 or HVI 916, but by Sections M1505.4.3 (whole-house mechanical ventilation airflow rates) and Section M1505.5 (local exhaust airflow rates), as applicable.

Table M1505.5: "One- and two-family dwellings" should be removed from the header, because this table is meant to apply to all occupancies within the scope of the IRC (e.g., including townhouses), not just one- and two-family dwellings.

To coordinate these modifications with Sections R325.4 and R325.5 of the IRC, a companion proposal is planned for the Group B hearings. Following is the proposal that is planned for Group B:

~~**R325.4 Opening location**. Outdoor intake and exhaust openings shall be located in accordance with Sections R325.4.1. and R325.4.2.~~

R325.~~3~~4.~~1~~ Outdoor air ~~l~~intake openings~~location~~. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots, and loading docks. ~~For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.~~

Exceptions:

1. The 10-foot (3048 mm) separation is not required where the intake opening is located 3 feet (914 mm) or greater below the contaminant source.

2. Separation fromVvents and chimneys terminals serving fuel-burning appliances or fireplaces shall be terminated in accordance complywith the applicable provisions of Chapters 18 and 24.

3. Separation fromCclothes dryer exhaust duct terminations shall be terminated in accordance comply with Section M1502.3.

4. Separation from exhaust terminations serving living spaces, attics, or crawl spaces shall comply with Section M1504.3.

~~**R325.4.2 Exhaust openings.** Exhaust air shall not be directed onto walkways.~~

R325.4~~5 Outside~~ Outdoor air intakeopening protection. ~~Air exhaust and~~Outdoor airintake openings ~~that terminate outdoors~~ shall be protected with corrosion-resistant screens, louvers or grilles having an opening size of not less than 1/4 inch (6 mm) and a maximum opening size of 1/2 inch (13 mm), in any dimension. Outdoor air intake ~~O~~openings shall be protected against local weather conditions.Outdoor air ~~exhaust and~~intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Within this proposal, there are no substantive changes that would affect the cost of compliance. The proposal is intended to clarify current requirements and to better coordinate with the IECC-R.

Comment (CAH2)# 720

RM7-24

IRC: M1601.1.1

Proposed Change as Submitted

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards* .
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
7. ~~Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:~~ *Building* framing cavities shall not be used as ducts or plenums.
   - 7.1. ~~These cavities or spaces shall not be used as a plenum for supply air.~~
   - 7.2. ~~These cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~
   - 7.3. ~~Stud wall cavities shall not convey air from more than one floor level.~~
   - 7.4. ~~Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by tight fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.~~
   - 7.5. ~~Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.~~
   - 7.6. ~~Building cavities used as plenums shall be sealed.~~
8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Reason: Section N1103.3.7 (R403.3.7 in the IECCC) states that *building* framing cavities shall not be used as ducts or plenums. However, section M1601.1.1 provides provisions for using joist framing cavities as return air plenums, which contradicts section N1103.3.7. This change would align M1601.1.1 with N1103.3.7, prohibiting the use of framing cavities as plenums.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Sections M1601.1.1 and N1103.3.7 are contradictory on the subject of joist cavities used as return air plenums. Section 102.1 states that, in the event of such a conflict, the more restrictive provision shall apply. In this case, section 1103.3.7 is the more restrictive provision,

and as such, is the provision which should govern. This proposed change merely clarifies section M1601.1.1 so that there is no confusion for users who may or may not notice the contradiction.

RM7-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of this proposal with a vote of 9-1. The committee justified its decision based on the notion of an increased cost impact. Additionally, builders should have some latitude in jurisdictions where these codes have yet to be adopted and should be allowed to continue to utilize framing cavities as plenums. The committee contended that since depressurization impacts other cavities, adjustments to the energy code, not the residential mechanical code, are suggested.

RM7-24

Individual Consideration Agenda

Comment 1:

IRC: M1601.1.1

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards .*
4. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
5. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.

7. ~~Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:~~ *Building* framing cavities shall not be used as ducts or plenums.

   ~~7.1. These cavities or spaces shall not be used as a plenum for supply air.~~

   ~~7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.~~

   ~~7.3. Stud wall cavities shall not convey air from more than one floor level.~~

   ~~7.4. Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by tight fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.~~

   ~~7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.~~

   ~~7.6. Building cavities used as plenums shall be sealed.~~

8. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Reason: In the 2012 IRC, Section N1103.2.3 was updated to state "Building framing cavities shall not be used as ducts or plenums." All newer versions of the IRC have included this requirement (Section N1103.3.7 in the 2021 IRC - Chapter 11 of the 2024 IRC was not available at the time of writing). However, Section M1601.1.1 of the IRC conflicts with Section N1103.3.7 of the IRC, which has led to confusion and questions on whether or not plenums are permitted. If a jurisdiction chooses to not adopt or to modify Chapter 11 of the IRC, such jurisdiction can also choose to modify Section M1601.1.1. However, the current IRC, with no modifications, is in conflict with itself. This proposal modifies Section M1601.1.1 to match Section N1103.3.7 so that the IRC is consistent throughout the document.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Sections M1601.1.1 and N1103.3.7 are contradictory on the subject of joist cavities used as return air plenums. Section 102.1 states that, in the event of such a conflict, the more restrictive provision shall apply. In this case, section 1103.3.7 is the more restrictive provision, and as such, is the provision which should govern. This proposed change merely clarifies section M1601.1.1 so that there is no confusion for users who may or may not notice the contradiction.

Comment (CAH2)# 459

RP3-24

IRC: P3103.1.2, P3103.1.4

Proposed Change as Submitted

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Residential Code

Revise as follows:

P3103.1.2 Roof used for recreational or assembly purposes. ~~Where a roof is to be used for assembly, as a promenade, observation deck or sunbathing deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof.~~ Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof.

P3103.1.4 Sidewall vent terminal. Vent terminals extending through the wall shall terminate not less than 10 feet (3048 mm) from ~~a~~ the *lot line* and ~~not less than~~ 10 feet (3048 mm) above the highest adjacent grade ~~elevation~~ within 10 feet (3048 mm) ~~in any direction~~ horizontally of the vent terminal. V~~ent pipes shall not terminate under the overhang of a structure where the overhang includes soffit vents. Such vent terminals shall be protected by a method that prevents birds and rodents from entering or blocking the vent pipe opening and that does not reduce the open area of the vent pipe.~~
Vent terminals shall not terminate under the overhang of a structure with soffit vents. Sidewall vent terminals shall be protected to prevent birds and rodents from entering or blocking the vent opening.

Reason: The language in sections 3103.1.2 and 3103.1.4 (IRC) do not match sections 903.1.2 and 903.1.4 of the IPC. This proposed change edits the IRC provisions to match the ones found in the IPC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change merely edits the provision language to match the IPC. The code requirements are not changed, merely edited into a more clear format.

RP3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The terms "restaurants" and "bars" are inappropriate for the IRC. This section doesn't need to match the IPC. (10-0)

RP3-24

Individual Consideration Agenda

Comment 1:

IRC: P3103.1.2, P3103.1.4

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

P3103.1.2 Occupiable Roofs ~~Roof used for recreational or assembly purposes.~~ ~~Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open~~ Open vent pipes which are to be located within 7 feet of an occupiable roof shall terminate not less than 7 feet (2134 mm) above ~~the~~ such roof.

P3103.1.4 Sidewall vent terminal. Vent terminals extending through the wall shall terminate not less than 10 feet (3048 mm) from the *lot line* and 10 feet (3048 mm) above the highest adjacent grade within 10 feet (3048 mm) horizontally of the vent terminal. V
Vent terminals shall not terminate under the overhang of a structure with soffit vents. Sidewall vent terminals shall be protected to prevent birds and rodents from entering or blocking the vent opening.

Reason: The committee denied this proposal at CAH1, stating that:

"The terms "restaurants" and "bars" are inappropriate for the IRC. This section doesn't need to match the IPC."

Residential roofs are sometimes occupiable, as is acknowledged by the use of the term "occupiable roof" throughout the IRC. We have adjusted this proposal to utilize the existing term "occupiable roof" in conformance with IRC language, in lieu of matching the IPC language. Since residential roofs may be occupiable, such roofs could be impacted by placement of open vent pipes terminating in close proximity to the occupiable roof. This proposal attempts to minimize this potential for impact without affecting vents which are located far away from the occupiable roof (such as side wall vents, or vents on a non-occupiable portion of the roof).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The 2024 IRC already requires vent pipes to terminate 7 feet above roofs used for recreational purposes. This proposal merely edits the language for clarity regarding vents which are located far away from the occupiable portion of the roof, and standardizes the terminology with existing terminology used throughout the IRC.

Comment (CAH2)# 421

RP7-24

IRC: TABLE P2903.2

Proposed Change as Submitted

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head [a]	~~2.5~~2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head. Where a shower compartment is served by multiple shower heads, the concurrent discharge of all shower heads controlled by a single valve shall not exceed the maximum flow rate.

b. Consumption tolerances shall be determined from referenced standards.

Reason: This proposal requires a maximum flow-rate of 2.0 gpm at 80 psi standard for showerheads in residential homes. This requirement is consistent with a similar requirement in the 2024 International Plumbing Code. More stringent standards have been adopted in multiple states including Maine, Hawaii, Washington, Oregon, New York and California. There is wide technological availability and very cost-effective water and energy savings for hot water usage. There is wide technological availability—of the 17,275 showerheads listed in DOE's Compliance Certification Database, 14,146 or 82% meet the 2.0 gpm standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow (for a 5 minute shower, that would mean 8 gallons of water with a compliant showerhead versus 10 gallons of water for a non-compliant showerhead). For a typical single family home which has roughly 2.2 showerheads, this proposal would save approximately 5,100 gallons of water per year and result in $1,170 in utility cost savings over the 10 year life of the fixture. While this has significant energy and water savings, the incremental impact for a building's plumbing system is negligible.

Bibliography: [1] https://efiling.energy.ca.gov/getdocument.aspx?tn=205654
[2] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf
[5] https://www.eia.gov/consumption/residential/data/2020/#waterheating

[6] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3
[7] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm
[8] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for showerheads is zero because there is no cost premium for a compliant product.[1]

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for showerheads is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical single family home which has roughly 2.2 showerheads, this proposal would save approximately 5,100 gallons of water per year and result in $1,170 in utility cost savings over the 10 year life of the fixture.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,170 in life cycle cost savings, we assumed one showerhead would save 2,247 gallons of water per year resulting in 261 kWh of electricity savings and 13.4 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program.[2] It was assumed that a typical single family home has roughly 2.2 showerheads.[3] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the showerhead was estimated to be 10 years.[4] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[5] Electricity was estimated to cost $0.15/kWh[6], natural gas was estimated at $1.42/therm[7] fuel oil was estimated at $3.06/therm[8] using average annual residential utility prices from the Energy Information Administration.

RP7-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Shower users will stay in the shower longer, therefore there is no water savings. There is no data to support that there is a water savings. (10-0)

RP7-24

Individual Consideration Agenda

Comment 1:

IRC: TABLE P2903.2

Proponents: Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head [a]	~~2.0~~ 2.5 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head. Where a shower compartment is served by multiple shower heads, the concurrent discharge of all shower heads controlled by a single valve shall not exceed the maximum flow rate.

b. Consumption tolerances shall be determined from referenced standards.

Reason: This public comment differs from the proposal as submitted by restoring the code's current maximum flow rate for shower heads of 2.5 gpm, but keeping the addition to the footnote that limits the concurrent flow from all shower heads controlled by a single valve to 2.5 gpm.

In disapproving the proposal as submitted, the committee raised a concern that people would take longer showers when using shower heads with lower maximum flow rates, and thus there would be no savings. However, this public comment removes the concern about lower flow rates entirely. The comment confines the proposal to ensuring that the code's current requirement (as well as similar federal, state, and local requirements) for the maximum flow rate for a shower head (2.5 ppm) is not bypassed with multi-head arrays operating simultaneously through a single valve to produce wasteful flows of 5 gpm or more. As modified by the public comment, this proposal is a common sense clarification to the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a clarification, and imposes no additional costs of construction to achieve compliance.

Comment (CAH2)# 591

RP8-24

IRC: P2905.3

Proposed Change as Submitted

Proponents: Anthony Floyd, City of Scotsdale, City of Scottsdale (afloyd@scottsdaleaz.gov); Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org)

2024 International Residential Code

Revise as follows:

P2905.3 Hot water supply to fixtures. The *developed length* of *hot water* piping, from the source of the *hot water* to the fixtures that require *hot water*, shall not exceed ~~100 feet (30 480 mm)~~50 feet (15 240 mm) Water heaters and recirculating system piping shall be considered to be sources of hot water.

Reason: This change reduces the length of hot water supply line from the source of hot water to the fixtures unless part of a hot water recirculation system. The 50-foot limit is replicated from IPC Section 607.2. Hot water supply lines greater than 50 feet waste water (proportional to pipe size) while occupants wait for hot water to reach fixtures for bathing, washing and culinary purposes. Even though hot water supply lines are insulated, the hot water remaining in the lines between demand periods cools down. Limiting the length and consequent volume of heated water in the supply lines reduce the amount of wasted water and occupant waiting time.

Bibliography: WaterSense Guide for Efficient Hot Water Delivery Systems -https://www.epa.gov/sites/default/files/2017-01/documents/ws-homes-hot-water-distribution-guide.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

A hot water pump will be required where the hot water supply line exceeds 50 feet between the water heater and furthest fixture. The immediate cost of a recirculation pump range from $100 to $400 depending on size and control features.

Estimated Immediate Cost Impact Justification (methodology and variables):

Variables include length of hot water supply line between the water heater and the furthest fixture. Approximately 10 to 15 percent of the energy use associated with a hot water delivery system is wasted in distribution losses. The average home wastes more than 3,650 gallons of water per year waiting for hot water to arrive at the point of use. Annual energy and water savings will offset the upfront cost within 5 years.

RP8-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The cost to install a recirculation pump at the water heater is at least $800-$1000. The cost to the homeowner is greater. The IRC should not match what is in the IPC as the cost impact is unacceptable. There are other options that can be used. (10-0)

RP8-24

Individual Consideration Agenda

Comment 1:

IRC: SECTION 202 (New), P2905.3

Proponents: Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org); Anthony Floyd, City of Scottsdale, City of Scottsdale (afloyd@scottsdaleaz.gov) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Residential Code

Add new definition as follows:

PRINCIPAL SHOWER. The shower in a bathroom adjoining the largest bedroom. If no bathroom adjoins the largest bedroom. the shower in the largest bathroom is the principal shower.

Revise as follows:

P2905.3 Hot water supply to fixtures. The developed length of hot water piping, from the source of the hot water to the fixtures that require hot water, other than a principal shower, shall not exceed 100 feet (30 480 mm). The developed length of hot water piping, from the source of the hot water to a principal shower shall not exceed 50 feet (15 240 mm). Water heaters and recirculating system piping shall be considered to be sources of hot water.

Exception: A principal shower incorporated in an addition or repair shall be permitted to be connected to hot water piping with a developed length not greater than 100 feet.

Reason: As revised by this public comment, RP8-24 will be much narrower in scope while still providing substantial value to the home's residents. This comment maintains the code's current limitation on domestic hot water pipe length at 100 feet for all fixtures, except one: the primary shower, where the maximum hot water pipe length is reduced to 50 feet. To avoid ambiguity, a definition is added for "primary shower".

As noted in the proposal as introduced, limiting the length of domestic hot water piping reduces the amount of energy and water that is wasted as cold or tepid water is being purged while waiting for hot water to arrive. These benefits will accrue to residents over the life of the building. Focussing the new 50-foot limitation on the home's single primary shower will capture the lion's share of the benefits of the original proposal, while greatly reducing the likelihood that a hot water recirculation system will be installed. Note also that the 50-foot limit only applies to a primary shower in new construction, as repairs and additions are explicitly excluded. Thus, this requirement can be met at the design stage of a new home without adding hot water recirculation.

The revisions proposed in this public comment are responsive to concerns raised at the first committee hearing, namely that limiting hot water pipe length to 50 feet for all fixtures, including bar sinks, laundry trays, and powder rooms, etc., and all types of projects, including additions, would inevitably require the addition of a costly hot water recirculation system, which adds to costs and energy usage, obviating the cost-saving benefits of reduced energy and water use from the 50-foot limitation. So in response, the comment revises the proposal to limit its application to a primary shower, where purging is a significant and near-daily occurrence, and excludes repairs and additions from triggering the requirement. In this way, a new home's designer can accommodate the 50-foot pipe limit at the design stage, without incurring the cost of a recirculation system.

Available data supports a focus on reducing water purging at the shower. US EPA estimated in 2010 that per capita shower usage was 0.67 showers per day, which can be extrapolated to over 200 million showers nationwide each day. Consistent with this estimate, the Residential End Uses of Water Study 2 (2016) found that in single family homes, there are .66 showers per capita per day, or about 1.8 showers per household per day. Showers and faucets are the two largest uses of hot water. But while showers and faucets were found to use about the same amount of water overall, the share of hot water is higher in showers at 66% compared to faucets at 57%, resulting in higher hot water use for showers (18 gal/household/day) than for faucets (15 gphd). By zeroing in on the primary shower for reduced pipe length, this public comment will capture much of the savings intended by the original proposal without incurring the cost of a hot water recirculation system.

Long wait time for hot water to arrive for showering is a well-know consumer complaint. Without designers' attention to their DHW layouts, larger new homes can easily impose wait times of a minute or more on their new occupants. This can be illustrated by an example of a 100-foot run of copper L piping to a shower. Assuming the piping is 20 feet of 3/4 inch and 80 feet of 1/2 inch, a total of 1.47 gallons is entrained in the pipe run. Purging requires approximately twice this amount to be drawn before hot water for comfortable showering arrives, because after the standing water in the pipe is initially purged, the first draw of hot water from the water heater steadily loses heat until the pipe material itself heats up through its full 100-foot length. In this example, 2.94 gallons of water must be purged, and with a code-minumum showerhead flowing at 2.5 gpm, the resulting wait time is 1 minute and 10 seconds. If a high-efficincy showerhead is present, the wait time will be longer. Unless occupants take back-to-back showers, this waste of time, water, and energy will be repeated for every showring event over the life of the building. This proposal, as modified by this public comment, has the potential to cut such waste nearly in half.

Bibliography: US Environmental Protection Agency, WaterSense Specification for Showerheads Supporting Statement, March 4, 2010. https://www.epa.gov/watersense/product-background-materials#showerhead

US Environmental Protection Agency, WaterSense Guide for Efficient Hot Water Delivery Systems, July 24, 2014. https://www.epa.gov/sites/default/files/2017-01/documents/ws-homes-hot-water-distribution-guide.pdf

DeOreo et al, Residential End Uses of Water Version 2, Water Research Foundation, Report # 4309b, 2016.

IAPMO, Water Efficiency and Sanitation Standard for the Built Environment (WEStand) 2020, Table1003.7.1, Water Volume (oz/ft) For Distribution Piping Materials.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The code change proposal can be met through design changes without adding to construction costs. Reduced pipe length may result in cost savings for materials and labor.

Estimated Immediate Cost Impact Justification (methodology and variables):

Potential construction cost savings depend on the materials specified for the job.

A reduction of up to 50 feet of pipe length in new construction would reduce material costs by at least the following:

- 50 feet of copper L at $3.52/ft = $176.00
- 50 feet of PEX B at 30c/ft = $15.00

Fewer elbows or other fittings would yield additional savings. Labor savings would be additional.

Source: www.homedepot.com. July 7, 2024.

Comment (CAH2)# 575

FG1-24

IFGC: 303.3

Proposed Change as Submitted

Proponents: Guy McMann, Jefferson County Colorado, Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2024 International Fuel Gas Code

Revise as follows:

303.3 Prohibited locations. *Appliances* shall not be located in ~~sleeping rooms~~, bedrooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The *appliance* is a direct-vent *appliance* installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative *appliances*, vented gas fireplaces, vented gas *fireplace* heaters and decorative *appliances* for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section 304.5.
3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 6,000 Btu/h (1.76 kW). The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section 304.5.
5. The *appliance* is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an *approved* self-closing device. *Combustion air* shall be taken directly from the outdoors in accordance with Section 304.6.
6. A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m^2) that communicates with a space outside of a bedroom, bathroom, toilet room or storage closet.

Reason: 1. Replacing the words sleeping room with bedroom in the first paragraph of the code will align it with the exceptions. Nowhere in the exceptions is sleeping room used.

2. The question is, what is the difference between a sleeping room and a bedroom? The Miriam Webster dictionary defines a bedroom as: a room furnished with a bed and intended primarily for sleeping. There is no definition in Miriam Webster for sleeping room. A definition of sleeping area can be found in the Collins dictionary where a sleeping area is defined as: an area in a room or house where people can sleep but there is no definition of sleeping room. Law Insider has multiple citations for sleeping room from many different municipalities across the country. Most of the citations have differing opinions of what a sleeping room is or is not. In Chapter 2 of the IFGC, IMC, IBC or IRC sleeping room is not defined so anyone using the International Codes is left to figure out on their own what the term sleeping room encompasses. In summation, the words sleeping room are too vague for proper interpretation of what the code is trying to describe.

3. Sleeping room is a holdover from the 2003 IFGC Section 303.3 Prohibited locations code. There is no definition for sleeping room in Chapter 2 of the 2003 IFGC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost as this is editorial in nature.

FG1-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee agrees 9-1 that the sleeping room is different than a bedroom and the way the current proposal is written may leave room for more unintended consequences.

FG1-24

Individual Consideration Agenda

Comment 1:

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us) requests As Submitted

Reason: Chapter 2 (Definitions) does not list the term sleeping rooms/room. With no definition, use of the term sleeping rooms/room can change the meaning of the technical requirements of 303.3 (Prohibited locations). For example, walking through a room with a fold-out couch, futon or Murphy style bed to get to a mechanical room could potentially make any mechanical room a prohibited location. Anyone wanting to properly apply the requirements of 303.3 is left to determine on their own what a sleeping room is, making it impossible to have a consensus of what a prohibited location is for homeowners, contractors and code officials.

IFGC 201.3 TERMS DEFINED IN OTHER CODES

Where terms are not defined in this code and are defined in the International Building Code, International Fire Code, International Mechanical Code or International Plumbing Code, such terms shall have meanings ascribed to them as in those codes.

The IBC, IFC, IMC, IPC and IECC have no definition for the term “sleeping room”.

IFGC 201.4 TERMS NOT DEFINED

Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

Searching online for the term “sleeping room” multiple definitions from jurisdictions across the country can be found. For example,

1. Steamboat Springs, CO: Shall mean any room that has a bed, bunk beds, daybed or other furniture for sleeping, including, without limitation, a roll out couch or futon.

2. Kasson Township, MI: Sleeping room means space, other than a bedroom, used for overnight sleeping purposes.

3. Fayette, IA: Sleeping room means a room which has two working electrical outlets, an overhead light and a window to the outside.

4. El Paso County, CO: Pikes Peak Regional Building Department has an amendment to the 2021 IRC, Chapter 2 Definitions which states a sleeping room is a habitable space using primarily for sleeping purposes and containing a closet 16 inches or greater in depth.

Using these four examples it is apparent that sleeping room could be interpreted to be almost any room in a house, which could have the unintended consequence of making many mechanical rooms into a prohibited location. A contractor replacing a gas fired appliance who

has to walk through a room with a couch folded out into a bed might tell the homeowner the appliance is in a prohibited location. This assessment could encourage the homeowner to replace the appliance without obtaining a permit. Calling the room with the fold-out couch a sleeping room, a contractor might require the homeowner to make changes to the mechanical room such as

installing a self-closing gasketed door or to add another entrance. Any unnecessary changes such as these cost the homeowner for no other reason except that IFGC 303.3 has the term sleeping room in it. The same type of problem could occur when an inspector goes to a house to check a replacement appliance. The inspector might have to walk through a rec room that has a mattress on the floor and decide the mattress has made the rec room into a sleeping room and that the appliance is now installed in a prohibited location.

CAH1 COMMITTEE COMMENTS AND CONCERNS

It was mentioned by committee members and opponents to this proposed change that replacing sleeping room with bedroom would have unintended consequences by making the code less restrictive. I would argue keeping the term sleeping room has unintended consequences by making the code more difficult to properly enforce and goes against the stated purpose of the I Codes and Chapter 2, which is to maintain a consensus on the specific meaning of each term contained in the code. I would also argue that the IFGC is not in alignment with the other I codes because they do not reference sleeping room. It was also suggested at CAH1 that a definition should be added to the IFGC to clarify what a sleeping room is. Because of how ambiguous sleeping room is giving it a definition would be a very difficult task. An easier way to solve the problem is to remove sleeping rooms/room from 303.3 and replace it with bedrooms/bedroom. Why make a new definition for sleeping rooms/room when there is already an industry standard definition for bedroom? .

BENEFITS

1. Removing sleeping rooms/room from IFGC 303.3 and replacing it with bedrooms/bedroom provides better clarity of what is a prohibited location.

2. The purpose of each code cycle is to make the code easier to understand and more beneficial to anyone trying to properly apply the code.

3. Everyone knows what a bedroom is.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 388

FG4-24

IFGC: SECTION 202, SECTION 315 (New), 315.1 (New), 315.1.2 (New)

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Fuel Gas Code

Delete without substitution:

~~**[M] NONCOMBUSTIBLE MATERIALS.** Materials that, where tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.~~
2. ~~There shall not be flaming from the specimen after the first 30 seconds.~~
3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

Add new text as follows:

SECTION 315
NONCOMBUSTIBLE MATERIALS

315.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

315.1.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The so-called definition contained in the 2024 IFGC is said to be under the jurisdiction of the IMC (in accordance with the [M] in front of it). In fact it is not identical to the definition in the IMC, which reads: "Noncombustible material: a material that passes ASTM E136." Furthermore, the present definition in the IFGC is no longer consistent with the language contained in ASTM E136 and also addresses only one of the two options included in ASTM E136 for a material to be considered noncombustible. Finally, the "definition" in the IFGC is actually a "requirement" since it requires materials to meet certain criteria to be classified as a noncombustible material. ICC definitions should not contain requirements.

In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials, and that concept is consistent with the flawed "definition" in the IFGC.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second proposed section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

If no requirement exists for what is a noncombustible material, experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often confusion in the public mind between how to consider a material that performs better than typical combustible materials, but is not enough for the material to be

considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and that is that they need to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Equivalent proposals are being submitted to the IFC (by FCAC), the IPC, and the IMC, all of which use noncombustible materials.

Another proposal revises the definitions of "combustible material" in the IMC and IFGC to clarify that the whether a material is or is not noncombustible is the result of a classification. The IBC does not "define" a noncombustible material but contains requirements for such materials.

The language in section 703.3.1 of the IBC reads as follows:*703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.*

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply moves a requirement (that is not consistent with the present edition of ASTM E136) into a place where the requirement can be enforced.

FG4-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 10-4 to disapprove of the proposed code language. The committee suggests that a modification is needed for the inconsistency of the code language as submitted. This proposal recommends including a requirement for what materials shall be considered noncombustible materials, and that is that they need to comply with IBC Section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example, to ASTM E136.

FG4-24

Individual Consideration Agenda

Comment 1:

IFGC: SECTION 315, 315.1, 315.1.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

SECTION 315
NONCOMBUSTIBLE BUILDING MATERIALS

315.1 Testing. Noncombustible building materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

Revise as follows:

315.1.2 ~~Inherently noncombustible materials~~ Testing not required. ~~Inherently noncombustible materials, such as concrete and steel,~~ The following building materials shall not be required to be tested to be acceptable as noncombustible building materials.

1. Steel,
2. concrete, containing no combustible aggregates or fibers,
3. masonry, containing no combustible aggregates or fibers,
4. glass (excluding plastic glazing),
5. 5xxx and 6xxx series aluminum alloys.

Reason: The so-called definition contained in the 2024 IFGC is said to be under the jurisdiction of the IMC (in accordance with the [M] in front of it). In fact it is not identical to the definition in the IMC, which reads: "Noncombustible material: a material that passes ASTM E136." Furthermore, the present definition in the IFGC is no longer consistent with the language contained in ASTM E136 and also addresses only one of the two options included in ASTM E136 for a material to be considered noncombustible. Finally, the "definition" in the IFGC is actually a "requirement" since it requires materials to meet certain criteria to be classified as a noncombustible material. ICC definitions should not contain requirements.

Several materials can claim to be inherently noncombustible, in many cases without it being truly valid. For example, any plastic or wood materials are always combustible. This issue is an important consideration for building materials (see several examples in the IFGC where there are requirements that are different depending on whether the materials are or are not noncombustible).

Some materials exist (often insulation materials) where it is not possible to determine without testing (normally to ASTM E136, as required in the IBC) whether they are truly noncombustible. For example, fiberglass insulation materials will always contain some combustible binder to be useful. The material can pass the ASTM E136 test (and be noncombustible) if it contains a small amount of binder but fail the test with larger amount of binder. That can only be determined by testing and is impossible to note visually.

It makes no sense to test steel, concrete or masonry (if they contain no combustible aggregates or fibers; this would have to be certified by the proponent). Therefore, as it has been shown by testing (and common sense) that testing steel, concrete or masonry to ASTM E136 is unnecessary, as they will pass the test they can be excluded from being required to be tested.

However, some new building materials are made with organic (such as foam plastics) components to lower the weight and make them easier to manipulate. In that case, it is unclear whether they are truly noncombustible materials, and they would need to be tested to know the answer for sure. That is why the requirement has been added that they contain no combustible aggregates or fibers.

Test results from at least two testing labs have been able to show that glass (whether ordinary glass or quartz) truly meets the requirements of ASTM E136 and is a noncombustible material. The same is not true for other glazing materials, which are typically plastic and are combustible; they must be excluded.

That brings up the question of aluminum. Typical building materials are, more often than not, alloys of aluminum and other metals. The Aluminum Association has published a report in Building Safety Journal (August 17th, 2020) where they discuss the “noncombustibility” of aluminum. It is of great interest that the 4 aluminum alloys that they tested “were selected for their widespread use in construction”.

Those alloys tested all passed the ASTM E136 test. However, the same report also states that “Aluminum, just like many comparable metals, is not combustible in any general application other than when it is specifically made to be.” That suggests that there may be some aluminum alloys that may or may not be noncombustible. After considerable debate and investigation of test reports, consensus was reached that most of the aluminum alloys used as building materials belong to the 6xxx series of alloys, with less than 1.2% magnesium, and the main ones (such as 6063, 6061, 6005) have all been tested for noncombustibility. In terms of sheet aluminum products, the series 5xxx alloys (such as 5052, 5083, 5005) are often used in construction, with higher levels if magnesium (the highest being 5083, which contains 4.9% magnesium). This product has also been tested and shown to be noncombustible. Therefore, consensus was reached that it is safe to include “5xxx and 6xxx series aluminum alloys” to the list of building materials that do not require testing to be considered noncombustible materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This will clarify that a number of materials are clearly noncombustible and will not require additional fire testing. If anything, this comment will decrease costs because less testing for non combustibility will be needed.

Comment (CAH2)# 107

FG11-24 Part I

IFGC: SECTION 202, SECTION 202 (New), 301.3.1 (New), 301.3.2 (New), 301.5, 634.1, 701.1, 705.5.4

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE FUEL GAS CODE COMMITTEE. PART II WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Fuel Gas Code

Revise as follows:

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas or mixtures of these gases including up to 5-percent hydrogen gas by volume.

Add new definition as follows:

HYDROGEN ADMIXTURE. Fuel gas to which hydrogen is blended or mixed by the fuel supplier or at the point of delivery greater than 5% and less than 95%.

Add new text as follows:

301.3.1 Appliances and equipment listed and labeled for use with hydrogen admixture. Appliances and equipment operating on hydrogen admixtures shall be listed and labeled for operation on the hydrogen admixture limits defined under Section 101.2.1.1.

301.3.2 Piping systems listed and labeled for use with hydrogen admixture. Piping systems and fuel gas system components shall be listed and labeled for the applicable hydrogen admixture limits.

Revise as follows:

301.5 Label information. A permanent factory-applied nameplate(s) shall be affixed to *appliances* on which shall appear in legible lettering, the manufacturer's name or trademark, the model number, serial number and, for *listed appliances*, the seal or mark of the testing agency. A label shall include the hourly rating in British thermal units per hour (Btu/h) (W); the type of fuel gas *approved* for use with the *appliance*; and the minimum *clearance* requirements.

634.1 Installation. The installation of gaseous hydrogen systems shall be in accordance with ~~the applicable requirements~~ Chapter 7 of this code, the *International Fire Code* ~~and~~ the *International Building Code* and NFPA 2.

701.1 Scope. The installation of *gaseous hydrogen systems* shall comply with this chapter, ~~and~~ Chapters 53 and 58 of the International Fire Code and NFPA 2. Compressed gases shall also comply with Chapter 50 of the International Fire Code for general requirements.

705.5.4 Placing equipment in operation. After the *piping* has been placed in operation, all *equipment* shall be purged in accordance with ~~Section 707.2~~ NFPA 2 and then placed in operation, as necessary.

Reason: FUEL GAS

Natural gas utilities are implementing projects to blend gaseous hydrogen into natural gas to reduce their systems and consumers' "carbon footprints." Hydrogen admixtures have raised questions of compatibility of these blends with existing appliances, equipment, and piping systems and components.

Following the submission of a request for interpretation, CSA Group standards Technical Committees were provided access to a range of test data from a variety of sources, and upon careful review and analysis, agree that natural gas containing up to and including 5% of Hydrogen is covered by testing with Test Gas A. The Request for Interpretation (RFI), and the position of the Technical Committees, have

been published here:https://www.csagroup.org/documents/Formal_Interpretations.pdf

As a result, PMG CAC sees no reason to add specifications for such blends in ANSI accredited standards. However, code officials using the ICC Codes would be aided in understanding through the definition of 'fuel gas' that such blends are covered through the revised definition.

HYDROGEN ADMIXTURE

The proposed definition is to address Hydrogen Admixtures in the IFGC. Currently provisions do not exist to address Hydrogen Admixtures and their ranges when introduced to natural gas. Chapter 7 of the IFGC regulates Gaseous Hydrogen Systems which are defined as being 95% or higher GH2. This definition will help address ranges of hydrogen admixtures from 6%-94%.

Section 301.3.1

This is one of several proposals that address the potential for hydrogen admixtures. This specific proposal is designed to clarify that Appliances which operate on hydrogen admixtures are treated the same way all other fuel burning appliances are considered. They need to be listed and labeled for the specific fuel mixture that is supplied. This section is applicable to the IRC Chapter 24 as well as the IFGC.

Section 301.3.2

This is one of several proposals that address the potential for hydrogen admixtures. This specific proposal is designed to clarify that all piping and components which are intended to carry hydrogen admixtures are treated the same way all other piping and system components are considered. They need to be listed and labeled for the specific fuel mixture that is being transported. This section is applicable to the IRC Chapter 24 as well as the IFGC.

Section 301.5This proposal updates the current word fuel to fuel gas to ensure correlation to the revised definition for fuel gas that includes up to 5% hydrogen admixture by volume. All other fuels in accordance with Section 301.1.1 shall be regulated by the International Mechanical Code.

Section [A]101.2.1 scopes gaseous hydrogen systems directly to Chapter 7 which is complete for the for the piping system. A direct link to NFPA 2 has been provided for additional provisions that standard provides for.

Section 701.1

Once the user gets to the IFC references they find pointers to NFPA 2. This provides for a direct linkage which is important for those jurisdictions that do not use the IFC for construction purposes.Section 705.5.4

The IFC relies on NFPA 2 for this requirement and this change provides for consistency, Section 707.2 is proposed to be modified to point to NFPA 2.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of different fuel types to address the trend towards blended fuels.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 10-0 to disapprove of this proposal. The committee justified the suggested code language as not feasible in its current form. A modification would have supported the approval of this change; however, the proposed code language does not allow for the inference of safety for existing appliances in use.

FG11-24 Part I

Individual Consideration Agenda

Comment 1:

IFGC: SECTION 202, 301.3.1, 301.3.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas or mixtures of these gases including up to 5-percent hydrogen gas by volume.

HYDROGEN ADMIXTURE.
Fuel gas to which hydrogen is blended or mixed by the fuel supplier or at the point of delivery greater than 5% by volume ~~and less than 95%~~.

301.3.1 Appliances and equipment listed and labeled for use with hydrogen admixture. Appliances and equipment operating on hydrogen admixtures shall be listed and labeled for operation ~~on~~ within the hydrogen admixture limits defined under Section ~~101.2.1.1~~ 101.2.2.1.

Delete without substitution:

~~**301.3.2 Piping systems listed and labeled for use with hydrogen admixture.** Piping systems and fuel gas system components shall be listed and labeled for the applicable hydrogen admixture limits.~~

Reason: This As Modified proposal adds a new definition of fuel gas that includes blends of hydrogen up to and including 5%. It also adds new definition of hydrogen admixtures and includes admixes greater than 5% but not exceeding 20% by volume of hydrogen. In addition, it adds new requirements that appliances burning admixtures shall be listed and labeled for the specific hydrogen admixture gas/hydrogen composition. Lastly, it deletes requirements for piping and components to be listed and labeled for hydrogen admixtures.

It is the intent of this As Modified proposal is to enable Hydrogen Admixtures that do not exceed 20%. Current industry testing is yielding results that do not need to go up to 95% Hydrogen Admixtures but rather limits them to 20% hydrogen, at this time. This suggested modification will align the IFGC with current technology and testing.

Deletion of proposed 301.3.2 is consistent with current IFGC requirements for fuel gas piping and components. In the IFGC Listing and Labeling pertains to the appliance itself in Section 301.3. It then goes on, in Chapter 4, to require specific listings for specific materials (piping, fittings, flow controls, etc…).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a clarification of different fuel types to address the trend towards blended fuels.

Comment (CAH2)# 326

Comment 2:

IFGC: SECTION 202

Proponents: Ted Williams, Natural Gas Direct, LLC, Natural Gas Direct, LLC (ngdllc@outlook.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

FUEL GAS. A ~~Natural~~ natural gas(including natural gases with up to and including 5 percent hydrogen gas by volume)
, manufactured gas, liquefied petroleum gas or mixtures of these gases.
~~including up to 5 percent hydrogen gas by volume.~~

HYDROGEN ADMIXTURE.
~~Fuel gas to which hydrogen is blended or mixed by the fuel supplier or at the point of delivery greater than 5% and less than 95%.~~

Natural gas into which hydrogen is blended or mixed by the fuel supplier or at the point of delivery to concentrations greater than 5% by volume.

Reason: Testing and analysis of natural gases containing up to and including 5% hydrogen by volume, whether introduced through admixing (i.e., blending) or incidentally introduced to the gas supply from other sources, have shown that physical and combustion properties of these compositional changes to natural gases due to hydrogen do not alter or negatively affect the interchangeability of the baseline natural gas (without hydrogen) from the resulting admixtures. However, natural gas admixtures with concentrations greater than 5% by volume must be specifically identified as “hydrogen admixtures,” which would be consistent with international descriptions of natural gas/hydrogen admixtures. The definition of "fuel gas" is changed editorially to clarify that hydrogen admixing applies to natural gas blending with hydrogen, not the other fuel gases covered by the definition.

Upper bounds for these hydrogen admixtures of natural gas may be defined in terms of physical, combustion, or interchangeability limits, and since these effects on natural gas may become significant with respect to composition and added hydrogen, those limits need to be addressed in IFGC requirements as supported by available research and analysis. The revised definition for “fuel gas” and new definition for “hydrogen admixture,” together with the requirements proposed here, present a coherent way of including natural gas/hydrogen admixture coverage in the IFGC and are technically consistent with changes being proposed in other codes and standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes to definitions will not affect cost of construction since the additional coverage of hydrogen admixtures do not require differences in specifications or materials from fuel gas systems or appliances and equipment.

Comment (CAH2)# 551

M2-24

IMC®: CHAPTER 2, SECTION 202, CHAPTER 4, SECTION 403, 403.3.2, 403.3.2.1, 403.3.2.3, TABLE 403.3.2.3

Proposed Change as Submitted

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gayathri@swinter.com); Dylan Martello, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (dmartello@swinter.com)

2024 International Mechanical Code

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

BALANCED VENTILATION SYSTEM. A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10 percent of the average of the two airflow rates.

CHAPTER 4
VENTILATION

SECTION 403
MECHANICAL VENTILATION

403.3.2 Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

where: Q_{OA} = outdoor airflow rate, cfm **(Equation 4-9)**

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.

2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation system*.

Revise as follows:

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

Exception: Where the outdoor air ventilation system is a *balanced ventilation system*, the minimum continuous kitchen exhaust rate shall be reduced to 25 cfm and the minimum continuous bathroom exhaust rate shall be reduced to 20 cfm.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: There is an exception 2.2 allowed in 403.3.2.1 which is impractical for use since there isn't a corresponding exception in 403.3.2.3. In a balanced system, if you reduce the supply air, you must also allow for a reduction in the exhaust air flows. This proposal creates that needed exception. The attached excel file demonstrates that these lower proposed continuous exhaust values (25cfm/kitchen and 20 cfm/bath) make the exception 2.2 more feasible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no expected change in cost - maybe a cost decrease since it could reduce the capacity needed for the balanced ventilation system.

Attached Files

- **2027 IMC balanced dwelling unit ventilation examples.xlsx**
  https://www.cdpaccess.com/proposal/10566/30527/files/download/4344/

M2-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove this proposal by a vote of 12-2. The committee's decision was based on proposed reductions that conflict with other provisions in the code that address exhaust air flows and values.

Individual Consideration Agenda

Comment 1:

IMC®: 403.3.2.3, TABLE 403.3.2.3

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gvijayakumar@swinter.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

Revise as follows:

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

Exception: Where the outdoor air ventilation system is a *balanced ventilation system*, the minimum continuous kitchen exhaust rate shall be reduced to 35 ~~25~~ cfm and the minimum continuous bathroom exhaust rate shall be reduced to 20 cfm.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: This public comment is in support of the proposed change to allow the lower local exhaust rates previously allowed in the IMC, but limiting the reduction only when used with balanced ventilations systems.

The ROCAH indicates that the decision to Disapprove was partly based on CAH testimony that implied there was a 'conflict with other provisions in the code'.

The section referenced in the testimony was 501.4 (Pressure equalization) and actually does not pose any 'conflict'.

The language in 501.4 referenced in the testimony is the same text as when the local exhaust rates were 25 / 20 cfm in 2021 IMC. If it did not pose a conflict then, it does not pose a conflict if the rates return to those same values in 2027 IMC.

The reason to allow the lower rates for balanced provides consistency with the 30% lower rates currently allowed for balanced systems. This PC increases the 25 cfm to 35 cfm to match the 30% reduction already allowed in Exception 2 of 403.3.2.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Possible decrease in cost compared to 2024 IMC requirement.

Comment (CAH2)# 243

M3-24

IMC®: SECTION 202 (New), CHAPTER 4, SECTION 405, 405.1, 405.2 (New)

Proposed Change as Submitted

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org)

2024 International Mechanical Code

Add new definition as follows:

BUILDING READINESS PLAN. A plan that documents the engineering controls that the facility mechanical systems will use for the facility to achieve its goals in non-normal mode.

CHAPTER 4
VENTILATION

SECTION 405
SYSTEMS CONTROL

405.1 General. Mechanical ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the spaces are occupied. Air-conditioning systems that supply required *ventilation air* shall be provided with controls designed to automatically maintain the required outdoor air supply rate during occupancy.

Add new text as follows:

405.2 Alternate Operation Capabilities. Where facilities are designed to operate in various modes in response to natural or manmade threat to/exposure of the building, the following shall be documented through an approved Building Readiness Plan (BRP). The BRP shall include the operations and maintenance (O&M) procedures involved in this operating mode, the mechanical equipment affected, final design drawings, critical asset inventory management plan, maintenance schedules, the maintenance requirements, frequencies, and establish a return to normal mode review period.

Reason: The Pandemic has demonstrated that it may be required to change operating mode of building mechanical ventilation systems under certain circumstances. These circumstances may include natural disasters such as forest fire, hurricane, pandemic, etc. or manmade such as terrorism, civil unrest, etc.

Building mechanical ventilation systems are now being built with different operating modes to reduce economic impact on the building and its occupant activities.

When such mode is created, they shall be documented for building operator to be aware of the capabilities available to operate the building.

The code does not mandate the need for alternative operating mode.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal documents alternate operational capabilities and does not impact construction.

M3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove this proposal by a vote of 10-4. The committee's decision was based on the proposal's unclear expectations and the proponents suggestion that this proposal is editorial in nature. The consensus of the committee is that the proposed code language may belong in the IPMC. Another reason is that the cost impact statement is not correct. There is a concern that the cost impact will be substantial if there is a need to install a system with increased ventilation.

M3-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202, SECTION 408 (New), 408.1 (New)

Proponents: Bernard Clement, Johnson Controls, ICC/NEHA Pandemic Task Force (PTF) (bernard.p.clement@jci.com); Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com); Jonathan Flannery, ASHE/AHA, PTF CDWG (jflannery@aha.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

BUILDING READINESS PLAN. A plan that documents the engineering controls that the facility mechanical systems will use for the facility to achieve its goals in ~~non-normal mode~~ response to natural or man-made emergencies.

Add new text as follows:

SECTION 408
SYSTEM DESIGN IN RESPONSE TO NATURAL OR MAN-MADE EXCEPTIONAL EVENT

408.1 General. Alternate Operation Capabilities. Where the ventilation system(s) in facilities are designed to operate in operationalize various alternate modes in response to natural or man-made emergencies anticipated to be over 96 hours threat to/exposure of the building, the registered design professional following shall document the alternate modes in the be documented through an approved Building Readiness Plan (BRP).The BRP shall include the emergency and related risk assessment, operations, and maintenance (O&M) procedures involved in this operating mode, the mechanical equipment affected, final design drawings, critical asset inventory management plan, maintenance schedules, the maintenance requirements, frequencies, and establish a return to

normal mode review period.

Reason: The changes to the original proposal address the concerns of the opponents and committee by:

1) Moving the proposal to a new section of Chapter 4 of the IMC.

2) Removed the term non-normal mode and modified the language to address emergencies anticipated to be over 96 hours. 96 hours is based on the current requirement by FEMA to address natural emergencies.

3) Removed the language regarding an approved BRP and added the language for a registered design professional

4) The PTF CDWG members and co-proponents agree with the committee that each condition will be unique. While this proposal does not require alternative modes to be implemented nor what or how those modes will be designed its requirement that these modes be documented in a usable plan will significantly assist owners in properly operating the alternative modes.

5) While the plan is about the operational alternative modes these are developed by the design engineer during the design process and need to be properly documented at this time such that the owner/operator can properly operate the system. Since this is a part of the design process it should be included within the IMC which governs the design of mechanical systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The decision to have various operational modes is not a requirement of this proposal. This proposal requires that if a building design includes alternate operational capabilities, these capabilities shall be documented in a building readiness plan (BRP). If an owner elects to have alternate modes of operations an operational sequence will be developed during the design process. This proposal only requires that this sequence be coordinated in a building readiness plan and since the sequence is already developed during the design process the cost of the plan will be negligible. Additionally, the plan does not require alternate modes to be implemented and any associated costs or savings with the implementation would be based on the owner's decision to implement the alternate modes and not the requirement to have a BRP.

Comment (CAH2)# 101

M5-24

IMC®: SECTION 202

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

BOILER.
A closed heating *appliance* intended to supply *hot water* or steam for space heating, processing or power purposes. Low-pressure boilers operate at pressures less than or equal to 15 pounds per square inch (psi) (103 kPa) for steam and 160 psi (1103 kPa) for water. High-pressure boilers operate at pressures exceeding those pressures. Multipurpose or combination boilers indirectly heat potable water through a heat exchanger.

WATER HEATER.
Any heating *appliance* or *equipment* other than a *boiler* that heats potable water and supplies such water to the potable *hot water* distribution system. Water heaters operate at pressures less than or equal to 150 pounds per square inch (psi) (1035 kPa) and 210°F (99°C). Multipurpose or combination water heaters provide space heating using the *hot water* supplied.

Reason: Clarify distinction between boilers and water heaters. Align with IMC 1002.2.2 which permits dual purpose water heaters using potable water hot water system, and IPC 608.17.3 which permits indirect heating of potable water by boilers.

The addition of water heater operating parameters provides distinction with the boiler definition which provides analogous parameters and aligns with the values in IPC 504.5.

These definitions are based on the appliance function which correlates to the standard(s) to which the appliance is listed. It is not uncommon for an appliance to be dual listed to as complying with more than one standard, and to be able to be configured for different uses. As an example, a commercial appliance may be simultaneously listed as conforming to a water heater standard, a boiler standard, and a pool and spa heater standard. The definition of this example appliance when installed would depend on how it is configured and utilized within the mechanical and plumbing system.

While some jurisdictions require compliance with ASME BPVC above certain vessel sizes and input capacities (e.g. 200,000 BTU/H input capacity and 120 gallon tank size), the distinction between a water heater and boiler is not dependent upon these parameters. The scope and requirements of the applicable product standards do not make these distinctions, and the function and requirements of the appliance within the mechanical and plumbing systems under scope of the IMC and IPC do not change based on these parameters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only clarifies the distinction between boilers and WHs .

M5-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: A committee vote of 8–6 disapproved the proposal. The committee reasoning is that the proposal needs work. There is currently a technical requirement in the definition. The committee would like to see this proposal again at CAH2.

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

BOILER.
A closed heating *appliance* intended to supply *hot water* or steam for space heating, processing or power purposes. Low-pressure boilers operate at pressures less than or equal to 15 pounds per square inch (psi) (103 kPa) for steam and 160 psi (1103 kPa) for water. High-pressure boilers operate at pressures exceeding those pressures. ~~Multipurpose or combination boilers indirectly heat potable water through a heat exchanger.~~

WATER HEATER.
Any heating *appliance* or *equipment* other than a *boiler* that heats potable water and supplies such water to the potable *hot water* distribution system. Water heaters operate at pressures less than or equal to 150 pounds per square inch (psi) (1035 kPa) and 210°F (99°C). ~~Multipurpose or combination water heaters provide space heating using the *hot water* supplied.~~

Reason: Based on feedback from the committee and from AHRI members, this revised version of M5-24 removes the language regarding multi-purpose boilers and water heaters. (As a result, the boiler definition does not change from the current code.) The concern with this language was that it may not be aligned with products available in the marketplace.

The remaining language from the original M5-24 proposal was retained. The intent is to better draw a clearer distinction between water heaters and boilers to improve code usability. The addition of water heater operating parameters provides distinction with the boiler definition which provides analogous parameters and aligns with the values in IPC 504.5. These definitions are based on the appliance function which correlates to the standard(s) to which the appliance is listed. It is not uncommon for an appliance to be dual listed to as complying with more than one standard, and to be able to be configured for different uses. As an example, a commercial appliance may be simultaneously listed as conforming to a water heater standard, a boiler standard, and a pool and spa heater standard. The definition of this example appliance when installed would depend on how it is configured and utilized within the mechanical and plumbing system.

While some jurisdictions require compliance with ASME BPVC above certain vessel sizes and input capacities (e.g. 200,000 BTU/H input capacity and 120 gallon tank size), the distinction between a water heater and boiler is not dependent upon these parameters. The scope and requirements of the applicable product standards do not make these distinctions, and the function and requirements of the appliance within the mechanical and plumbing systems under scope of the IMC and IPC do not change based on these parameters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The revised definitions clarifies existing requirements in the code.

Comment (CAH2)# 169

M7-24

IMC®: SECTION 202; IFGC: SECTION 202

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Mechanical Code

Revise as follows:

COMBUSTIBLE MATERIAL. Any material not classified as a noncombustible material. ~~defined as noncombustible~~.

2024 International Fuel Gas Code

Revise as follows:

[M] COMBUSTIBLE MATERIAL. Any material not classified as a noncombustible material ~~defined as noncombustible~~.

Reason: ICC definitions should not contain requirements. The present IMC definition of "noncombustible material" does actually contain the requirement that the material passes ASTM E136. Therefore, this proposal recommends a change in language so that a combustible material is one that is not "classified" (rather than "defined") as a noncombustible material.

Section 703.3.1 of the IBC determines how to classify a material as noncombustible. If a material does not comply with those requirements it is not noncombustible. However,. the IBC does not define a material as noncombustible. This proposal addresses both the IMC and the IFGC definitions because the IFGC definition is shown as being under the responsibility of the IMC (as it is preceded by [M]).

Alternate proposals recommend that the IMC and IFGC replace their definitions of a noncombustible material by referencing section 703.3.1 of the IBC, and moving the requirements to be placed in Chapter 3, on general requirements.

IBC language:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply changes a definition.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 9-5 to disapprove this proposal. The committee's reasoning is that the proposal appears to conflict with the IBC in determining whether something is combustible or not.

M7-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202; IFGC: SECTION 202

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

Delete without substitution:

~~**COMBUSTIBLE MATERIAL.** Any material not classified as a noncombustible material. .~~

2024 International Fuel Gas Code

Delete without substitution:

~~**[M] COMBUSTIBLE MATERIAL.** Any material not classified as a noncombustible material .~~

Reason: The only definition of "combustible material" in the ICC codes is the one in the IMC/IFGC and it is misleading. ICC definitions should not contain requirements and the definition of "noncombustible material" in the IMC is a requirement and it is proposed to be replaced by another proposal/comment.
Deleting this definition does not conflict with the IBC (nor with any other ICC code) since the IBC does not define a "noncombustible material" but contains, in section 703, a requirement as to how to assess whether a material is noncombustible.

Companion proposals to the IMC and IFGC send the user of the codes to the IBC for what is a noncombustible material. By default, if a material is not noncombustible, it is combustible.

Section 703.3.1 of IBC 2024 states as follows:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.
Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No cost impact as this simply deletes an unnecessary definition.

Comment (CAH2)# 194

M8-24

IMC®: SECTION 202 (New), 403.1, 403.3.2.1, 403.3.2.2 (New)

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

CORRIDOR. An enclosed *exit access* component that defines and provides a path of egress travel.

Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air*. ~~except that mechanical *ventilation air* requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof.~~The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are designed and installed in accordance with Section 403.3.2.1 and Chapter 6.

403.3.2.1 Outdoor air for dwelling units. Where a *dwelling unit* of new construction opens to a corridor, *outdoor air* shall be mechanically supplied directly to the *dwelling unit.* For other *dwelling units*,~~An~~ outdoor air ~~ventilation system consisting of ashall be provided using a~~ mechanical exhaust system, mechanical supply system or combination thereof ~~shall be installed for each *dwelling unit*~~. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as components of such a system.

~~The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.~~

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

~~(Equation 4-9)~~

~~where: Q_{OA} = outdoor airflow rate, cfm~~

~~A_{floor} = conditioned floor area, ft^2~~

~~N_{br} = number of bedrooms; not to be less than one~~

~~Exceptions:~~

1. ~~The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.~~
2. ~~The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:~~
   - 2.1. ~~A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:~~
     - 2.1.1. ~~Living room.~~
     - 2.1.2. ~~Dining room.~~
     - 2.1.3. ~~Kitchen.~~
   - 2.2. ~~The whole-house ventilation system is a *balanced ventilation system*.~~

Add new text as follows:

403.3.2.2 Outdoor air rate for dwelling units. The *dwelling unit's* outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor air rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

(Equation 4-9)

where: Q_{OA} = outdoor airflow rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum *outdoor air* rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   - 2.1. A ducted system supplies *outdoor air* directly to each bedroom and to one or more of the following rooms:
     - 2.1.1. Living room.
     - 2.1.2. Dining room.
     - 2.1.3. Kitchen.
   - 2.2. The *outdoor air* ventilation system is a *balanced ventilation system*.

Reason: Both ASHRAE 62.2 and the IMC require outdoor air to be provided to dwelling units. Research has demonstrated that a large percentage of the leakage area for attached dwelling units opening to enclosed corridors occurs across the corridor wall.[1] If an exhaust-only system is used to provide outdoor air for such units, we cannot realistically expect one unit of exhaust air to provide one unit of outdoor air. Increasing the exhaust airflow could potentially overcome the deficit, but this would also be expected to draw more air from the enclosed corridor, which is not permitted by IBC Section 1020.5 and IMC Section 601.2 (i.e., “Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.”). To ensure that outdoor air is provided directly to dwelling units opening to corridors, 62.2 was recently amended to prohibit exhaust-only ventilation systems from providing the outdoor air required by the standard. Increasing the exhaust airflow rate could also draw more air from adjacent units. This proposal will align the IMC’s requirements for ventilation of dwelling units that open to a corridor with the requirements of ASHRAE 62.2. For clarity, this proposal cross-walks the IBC definition for corridor to the IMC. There is no need to reference an “enclosed corridor” because the enclosed nature is part of the proposed definition of corridor.

Bibliography: 1. Bohac D., and Sweeney L. 2020. Energy Code Field Studies: Low-Rise Multifamily Air Leakage Testing. Prepared by the Center for Energy and Environment, Ecotope, and The Energy Conservatory. Prepared for the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. https://www.energycodes.gov/sites/default/files/documents/LRMF_AirLeakageTesting_FinalReport_2020-07-06.pdf. [See Table 45, which shows average leakage to “common” area of 42% for 211 tightly- constructed dwelling units in 20 buildings of new construction located in 6 states. The report also notes, “for buildings in this study, “common areas” are made up almost completely of corridors and a few small rooms such as mechanical closets and elevator rooms. The 42% leakage did not include leakage around the door separating a dwelling unit from the corridor, which would have further increased this value.]

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$513

Estimated Immediate Cost Impact Justification (methodology and variables):

An entry-level supply fan serving a single unit would cost about $240 (retail pricing as of May 22, 2023 through www.supplyhouse.com). According to Gordian Mechanical Costs with RSMeans data, 6" insulated flex duct would cost about $10.29/linear foot (line 233346101940; price includes installed cost for material and labor with contractor O&P and builder markup of 10%). For 20 feet of duct (to carry the supply air from an exterior wall to a supply register above the dwelling unit entryway), the ductwork is estimated at $10.29*20 = $206. A supply register is $67: $33 for the part and $34 for labor, based on an average of two HVAC contractor estimates. This provides the combined cost of $240+$206+$67 = $513.

Estimated Life Cycle Cost Impact:

$961

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Assumes the supply fan is replaced after 15 years and a discount factor of 3% for a net present value of $154, but the ductwork and register do not need to be replaced. Assumes filter replacement twice per year at $15 each, for a net present value of $294. Combining the immediate cost and replacement cost: $513 + $154+$294 = $961

Note, however, that IMC Section 601.2 prohibits corridors from serving as "ventilation air ducts." Because the corridor is not permitted to provide the required volume of outdoor air to the dwelling unit, it is incumbent on the designer to demonstrate that an exhaust-only system has been engineered to deliver the volume of outdoor air required. The additional system components needed to do so (e.g., dedicated outdoor air inlets, exhaust fan with higher ventilation capacity and larger ducting, improved air sealing of the dwelling unit to the corridor, etc.) and associated energy costs to operate them, would help to offset the incremental cost incurred for the supply system. For example, a study (2025-T24-Final-CASE-Report-MF-IAQ.pdf (title24stakeholders.com) found that compartmentalizing dwelling units to 0.3 cfm50/sf was approximately $450 and to 0.23 cfm50/sf was approximately $900, for an incremental sealing cost of $450 to reach the tightness required for exhaust-only systems to pull air through passive vents. (Although 0.23 cfm50/sf may not be tight enough, as discussed in Copy-of-Passive-vent-calculator-to-post-to-CARB-siteMACRO.xlsm (live.com). Assuming four passive vents at $50 each ($25 per vent, $25 for labor), an exhaust-only system has an immediate cost of approximately $450 + 4 x $50 = $650, similar to the supply-only system. Furthermore, exhaust-only systems introduce unfiltered particulate matter which can worsen IAQ, and drafts which cause discomfort to occupants.

M8-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:

403.3.2.1 Outdoor air for dwelling units. Where a *dwelling unit* of new construction opens to a ~~corridor~~ *corridor*, *outdoor air* shall be mechanically supplied directly to the *dwelling unit*. For other *dwelling units*, ~~outdoor air~~ *outdoor air* shall be provided using a mechanical ~~exhaust system~~ *exhaust system*, mechanical supply system or combination thereof. Local exhaust or supply systems, including ~~outdoor air~~ *outdoor air* ducts connected to the return side of an air handler, are permitted to serve as components of such a system.

403.3.2.2 *Outdoor air* rate for *dwelling units.* The *dwelling unit's* ~~outdoor air~~ *outdoor air* ventilation system shall be designed to provide the required rate of ~~outdoor air~~ *outdoor air* continuously during the period that the *building* is occupied. The minimum continuous ~~outdoor air~~ *outdoor air* rate shall be determined in accordance with Equation 4-9.

(Equation 4-9)

where:

Q_{OA} = ~~outdoor air~~*outdoor air* rate, cfm

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The ~~outdoor air~~ *outdoor air* ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average ~~outdoor air~~*outdoor air* rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum *outdoor air* rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *outdoor air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The *outdoor air* ventilation system is a *balanced ventilation system*.

Committee Reason: By a vote of 14-0, the committee voted to approve the proposal with modifications. The committee justifies the proposal and modification with the reasoning that the proposal aligns the code language among the I codes. With the approval of this proposal as modified, the ventilation standards for dwelling units facing a corridor will align with ASHRAE 62.2. To provide clarity, this suggestion correlates the IBC definition of a corridor to the IMC. Since the enclosed aspect is included in the suggested corridor definition, there is no need to reference an "enclosed corridor."

M8-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202, 403.1, 403.3.2.1, 403.3.2.2

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

CORRIDOR. An enclosed *exit access* component that defines and provides a path of egress travel.

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air.* The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are designed and installed in accordance with Section 403.3.2.1 and Chapter 6.

403.3.2.1 Outdoor air for dwelling units. Where a *dwelling unit* ~~of new construction~~ opens to a *corridor*, *outdoor air* shall be mechanically supplied ~~directly~~ to the *dwelling unit* through ducts or other equipment that terminate within the *dwelling unit*. For other *dwelling units,*

outdoor air shall be provided using a mechanical *exhaust system*, mechanical supply system or combination thereof. Local exhaust or supply systems, including *outdoor air* ducts connected to the return side of an air handler, are permitted to serve as components of such a system.

403.3.2.2 Outdoor air rate for dwelling units. The *dwelling unit's outdoor air* ventilation system shall be designed to provide the required rate of *outdoor air* continuously during the period that the *building* is occupied. The minimum continuous *outdoor air* rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

where: Q_{OA} = *outdoor air* rate, cfm **(Equation 4-9)**

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The o*utdoor air* ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average *outdoor air* rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum *outdoor air* rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *outdoor air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The *outdoor air* ventilation system is a *balanced ventilation system*.

Reason: The reason for the proposed changes are:

1) We do not need to refer to “a dwelling unit of new construction,” since the code is all about new construction, and the requirements for existing dwelling units are contained in 102.4 (additions, alterations, and repairs) and in the Existing Building Code.

2) To provide more precise language about how supply air is to be provided.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These suggestions for improving the language of M8 were provided through discussions at PMGCAC meetings after CAH #1. They are intended only to provide clarification and do not change the cost impact provided in our first proposal. The original cost impact statement is copied below.

Original cost impact (increase):
Estimated Immediate Cost Impact:
$513

Estimated Immediate Cost Impact Justification (methodology and variables):
An entry-level supply fan serving a single unit would cost about $240 (retail pricing as of May 22, 2023 through www.supplyhouse.com). According to Gordian Mechanical Costs with RSMeans data, 6” insulated flex duct would cost about $10.29/linear foot (line 233346101940; price includes installed cost for material and labor with contractor O&P and builder markup of 10%). For 20 feet of duct (to carry the supply air from an exterior wall to a supply register above the dwelling unit entryway), the ductwork is estimated at $10.29*20 = $206. A supply register is $67: $33 for the part and $34 for labor, based on an average of two HVAC contractor estimates. This provides the combined cost of $240+$206+$67 = $513.

Estimated Life Cycle Cost Impact:
$961

Estimated Life Cycle Cost Impact Justification (methodology and variables):
Assumes the supply fan is replaced after 15 years and a discount factor of 3% for a net present value of $154, but the ductwork and register do not need to be replaced. Assumes filter replacement twice per year at $15 each, for a net present value of $294. Combining the immediate cost and replacement cost: $513 + $154+$294 = $961.

Note, however, that IMC Section 601.2 prohibits corridors from serving as “ventilation air ducts.” Because the corridor is not permitted to provide the required volume of outdoor air to the dwelling unit, it is incumbent on the designer to demonstrate that an exhaust-only system has been engineered to deliver the volume of outdoor air required. The additional system components needed to do so (e.g., dedicated outdoor air inlets, exhaust fan with higher ventilation capacity and larger ducting, improved air sealing of the dwelling unit to the corridor, etc.) and associated energy costs to operate them, would help to offset the incremental cost incurred for the supply system. For example, a study (2025-T24-Final-CASE-Report-MF-IAQ.pdf (title24stakeholders.com) found that compartmentalizing dwelling units to 0.3 cfm50/sf was approximately $450 and to 0.23 cfm50/sf was approximately $900, for an incremental sealing cost of $450 to reach the tightness required for exhaust-only systems to pull air through passive vents. (Although 0.23 cfm50/sf may not be tight enough, as discussed in Copy-of-Passive vent-calculator-to-post-to-CARB-siteMACRO.xlsm (live.com). Assuming four passive vents at $50 each ($25 per vent, $25 for labor), an exhaust-only system has an immediate cost of approximately $450 + 4 x $50 = $650, similar to the supply-only system. Furthermore, exhaust-only systems introduce unfiltered particulate matter which can worsen IAQ, and drafts which cause discomfort to occupants.

Comment (CAH2)# 298

Comment 2:

IMC®: 403.3.2.1

Proponents: Greg Johnson, Johnson & Associates Consulting Services, National Multifamily Housing Council (gjohnsonconsulting@gmail.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Mechanical Code

Revise as follows:

403.3.2.1 Outdoor air for dwelling units. Where a *dwelling unit* ~~of new construction~~ opens to a *corridor*, one or more *ducts* shall supply *outdoor air* ~~shall~~ be ~~mechanically supplied directly~~ to the *dwelling unit*. For other *dwelling units, outdoor air* shall be provided using a mechanical *exhaust system*, mechanical supply system or combination thereof. Local exhaust or supply systems, including *outdoor air* ducts connected to the return side of an air handler, are permitted to serve as components of ~~such a~~ *ventilation* systems.

Reason: M8 is too prescriptive. There is no reason that the fan or fans moving outdoor air for corridor adjacent dwelling unit ventilation need to be located such that outdoor air is pushed into the unit versus located to pull outdoor air into the unit. What matters is that sufficient volume of outdoor air is ducted to the unit to mitigate potential draws from the corridor. Note that the building code prohibition on using corridors as plenums is intended to mitigate fire and smoke spread in a fire event. Until that fire event, any air movement between the dwelling unit and corridor has no significance. Ducting and appropriate fire resistive construction of penetrations and joints will address the fire event.

Also note that a parallel proposal to change ASHRAE 62.2 is being introduced at ASHRAE to remove this overly prescriptive requirement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

More design flexibility in fan location and selection should tend to reduce construction costs, but specific configurations of mechanical systems are difficult to anticipate to quantify potential benefits.

Estimated Immediate Cost Impact Justification (methodology and variables):

Variables would be the size and layout of of the affected dwelling units as well as the design of the ventilation systems serving those units. Given those variables it is impossible to estimate a specific cost reduction.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 198

M9-24

IMC®: SECTION 202 (New), 1104.2, 1106.3, 1106.4

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

EFFECTIVE DISPERSAL VOLUME. The volume of a space or connected spaces in which leaked *refrigerant* will disperse.

EFFECTIVE DISPERSAL VOLUME CHARGE (EDVC). The maximum *refrigerant* charge permitted for an *effective dispersal volume.*

Revise as follows:

1104.2 Machinery room. Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a *machinery room* where the quantity of refrigerant in an independent circuit of a *refrigeration system* exceeds both of the following:

1. T ~~t~~he amounts shown in Table 1103.1 , and
2. The effective dispersal volume charge as calculated in accordance with ASHRAE 15.

For refrigerant blends not listed in Table 1103.1, the same requirement shall apply ~~where the amount for any blend component exceeds that indicated in Table 1103.1~~ for each~~that~~ component. ~~This~~These requirements shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. *Machinery rooms* required by this section and containing only Group A1 or B1 refrigerants shall be constructed and maintained in accordance with Section 1105. ~~for Group A1 and B1 refrigerants and in accordance with Sections 1105 and 1106 for Group A2, B2, A3 and B3 refrigerants.~~ *Machinery rooms* required by this section and containing any Group A2, B2, A3, or B3 flammable refrigerants shall be constructed and maintained in accordance with Sections 1105 and 1106. *Machinery rooms* required by this section, containing any Group A2L or B2L flammable refrigerants and containing no Group A2, B2, A3, or B3 flammable refrigerants, shall be constructed and maintained in accordance with Section 1105 and Section 1106.4.1 through 1106.4.3.

Exceptions:

1. *Machinery rooms* are not required for *listed equipment* and *appliances* containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the *equipment's* or *appliance's* listing and the *equipment* or *appliance* manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a *machinery room* with those installed outdoors.

1106.3 Class 2 and 3 refrigerants. Where any flammable refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

1106.4 Group A2L and B2L refrigerants. *Machinery rooms* ~~for~~containing any Group A2L ~~and~~or B2L refrigerants and containing no refrigerants of Group A2, A3, B2, or B3 shall comply with Sections 1106.4.1 through 1106.4.3.

Reason: This proposal harmonizes with Addendum q to ASHRAE 15-2019. The latest published language of ASHRAE 15-2022 was used as the basis for this update. The revisions clarify which requirements apply in cases where a machinery room contains refrigerants from multiple safety groups. The revisions also refer to ASHRAE 15 for EDVC calculations, with the updated requirements for refrigerant charge quantity limits, for determination of when a machinery room is required.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will have no impact on the cost of construction. These changes for clarity are largely editorial in nature to better align the IMC with ASHRAE 15.

M9-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 7–6 against the proposal, with one member abstaining. The committee argues that the idea is improper since it does not clarify how to parcel out sections of the code. The committee is especially concerned about flammability and dangerous areas.

M9-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202 (New), SECTION 202, 1104.2, 1106.3, 1106.4

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

Add new definition as follows:

CONNECTED SPACES (REFRIGERATION). Two or more spaces connected by natural ventilation, a ducted air distribution system, or mechanical ventilation.

EFFECTIVE DISPERSAL VOLUME.
The volume of a space or ~~connected spaces~~*connected spaces* in which leaked *refrigerant* will disperse.

EFFECTIVE DISPERSAL VOLUME CHARGE (EDVC).
The maximum *refrigerant* charge permitted for an *effective dispersal volume.*

1104.2 Machinery room. Except as provided in Sections 1104.2.1 and 1104.2.2, all components containing the refrigerant shall be located either outdoors or in a *machinery room* where the quantity of refrigerant in an independent circuit of a *refrigeration system* exceeds both of the following:

1. The amounts shown in Table 1103.1, and
2. The effective dispersal volume charge as calculated in accordance with ASHRAE 15.

For refrigerant blends not listed in Table 1103.1, the same requirement shall apply for each component. These requirements shall also apply where the combined amount of the blend components exceeds a limit of 69,100 parts per million (ppm) by volume. *Machinery rooms* required by this section and containing only Group A1 or B1 refrigerants shall be constructed and maintained in accordance with Section 1105. *Machinery rooms* required by this section and containing any Group A2, B2, A3, or B3 flammable refrigerants shall be

constructed and maintained in accordance with Sections 1105 and 1106. *Machinery rooms* required by this section, containing any Group A2L or B2L flammable refrigerants and containing no Group A2, B2, A3, or B3 flammable refrigerants, shall be constructed and maintained in accordance with Section 1105 and Section 1106.4.1 through 1106.4.3.

Exceptions:

1. *Machinery rooms* are not required for *listed equipment* and *appliances* containing not more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety classification, where installed in accordance with the *equipment's* or *appliance's* listing and the *equipment* or *appliance* manufacturer's installation instructions.
2. Piping in compliance with Section 1107 is allowed in other locations to connect components installed in a *machinery room* with those installed outdoors.

1106.3 Class 2 and 3 refrigerants. Where any flammable refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

1106.4 Group A2L and B2L refrigerants. *Machinery rooms* containing any Group A2L or B2L refrigerants and containing no refrigerants of Group A2, A3, B2, or B3 shall comply with Sections 1106.4.1 through 1106.4.3.

Reason: In response to feedback from the Technical Committee, the definition of connected spaces is added for clarity. The effective dispersal volume for refrigeration systems is determined in accordance with ASHRAE Standard 15.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will have no impact on the cost of construction. These changes for clarity are largely editorial in nature and better align the IMC with ASHRAE 15.

Comment (CAH2)# 203

M11-24

IMC®: SECTION 202 (New), 1104.5 (New)

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Add new definition as follows:

GROUP CONTROLLER. An electrical or electronic control system that monitors and responds to multiple distinct inputs from two or more appliances or refrigeration machinery units.

Add new text as follows:

1104.5 Group Controller Requirements. Utilization of a group controller for multiple refrigeration systems serving the same space or connected spaces shall comply with the following:

1. The refrigerant detection system for each refrigeration system shall provide a signal to notify the group controller when mitigation actions are required in accordance with ASHRAE 15.
2. Where a group controller determines that a signal comes from one or more specific refrigeration systems, it shall be permitted for the group controller to specify which refrigeration systems activate or deactivate mitigation actions in accordance with ASHRAE 15. Where a group controller cannot determine the specific source of a signal, the group controller shall require all of the refrigeration systems serving the same space or connected spaces to activate mitigation actions in accordance with ASHRAE 15.

Reason: This code change proposal is for correlation with proposed revisions within Addendum t, ASHRAE 15-2022. Addendum t has undergone three Publication Public Reviews (PPRs) and is expected to be published in advance of the Technical Committee meetings. The requirements around group controllers contained within Addendum t are vital for data center applications, and detail how group controllers interact with refrigeration system mitigation strategies.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These changes will have no impact on the cost of construction. Use of a group controller is optional for refrigeration systems.

M11-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove this proposal with a vote of 8-6. The reasoning given is that addendum T has not been approved and that the proponent needs to develop a more suitable cost impact statement.

M11-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202, 1104.5

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

GROUP CONTROLLER.
An electrical or electronic control system that monitors and responds to ~~multiple~~ distinct inputs from two or more appliances or refrigeration machinery units.

1104.5 Group Controller Requirements. Utilization of a *group controller* for multiple *refrigeration systems* serving the same space or connected spaces shall comply with the following:

1. The refrigerant detection system for each *refrigeration system* shall provide a signal to notify the *group controller* when mitigation actions are required in accordance with ASHRAE 15.
2. Where a *group controller* determines that a signal comes from one or more specific *refrigeration systems*, it shall be permitted for the *group controller* to specify which *refrigeration systems* activate or deactivate mitigation actions in accordance with ASHRAE 15.
3. Where a *group controller* cannot determine the specific source of a signal, the *group controller* shall require all of the *refrigeration systems* serving the same space or connected spaces to activate mitigation actions in accordance with ASHRAE 15.
4. A *group controller* shall not deactivate mitigation actions where a refrigerant detection system outputs a signal to require *refrigerant* detector replacement.

Reason: We are submitting this comment based on the latest requirements from ASHRAE 15-2022 Addendum t, which is now published. These requirements are vital for data center applications where it is important to have group controllers for refrigerant system mitigation actions.

Bibliography: ANSI/ASHRAE Addendum t to ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems.
Published online at:

https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20addenda/15_2022_t_202

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal addresses how data center controls should be operating. It is unlikely to require new equipment because data centers are already equipped with extensive control systems due to the importance of monitoring. Under current requirements, controls are going to exist - for example - to ensure that every cooling unit can be regulated simultaneously through the building management system (BMS) in response to server loads throughout the day. Hence, this proposal would only require some programming changes to have the BMS to do one more thing than it already does, e.g., to increase airflow of a specific unit or units if there is a leak event.

Comment (CAH2)# 206

M18-24

IMC®: 307.2.1.1; IPC: [M] 314.2.1.1

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Mechanical Code

Revise as follows:

307.2.1.1 Condensate discharge. Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~ Condensate drains shall be installed in accordance with Section 802.1.5 of the International Plumbing Code. Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same occupancy, tenant space or dwelling unit as the source of the condensate.

2024 International Plumbing Code

Revise as follows:

[M] 314.2.1.1 Condensate discharge. Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~ Condensate drains shall be installed in accordance with Section 802.1.5.Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same occupancy, tenant space or dwelling unit as the source of the condensate.

Reason: This proposal is intended to correct an issue that was created by an approved proposal in the IMC. The IMC should never dictate what fixtures are permitted to receive waste or to supersede requirements already in place in the IPC. The allowance by the IMC to connect condensate discharge to a lavatory tailpiece or a bathtub overflow, this proposal was intended to get around requirements in the IPC. The IPC provides all direction necessary to deal with waste discharge including condensate. The stricken language allows for condensate discharge to connect to lavatory tailpiece as well as bathtub overflow connections, these are the two primary fixture to experience blockages due to hair clogs. Striking the language will prevent unintended flooding that would result from such a clog. A blockage wouldn't need to be a complete blockage, it would only need to be sufficient to keep the drain from keeping up with the4 condensate discharge produced by the equipment. Adding "**Condensate drains shall be installed in accordance with IPC 802.1.5."** provides a more correct path for compliance with the requirements in the IPC.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Condensate disposal is already required, if anything this proposal will eliminate potential costs associated to damage that could be the result of the portion removed.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of this proposal with a vote of 8-5. The reasoning given is that this drain type should be installed in accordance with the IPC. The adoption of the proposed code language would be an issue in multi-unit dwellings where tailpieces are regularly used for purposes such as condensation.

M18-24

Individual Consideration Agenda

Comment 1:

IPC: [M] 314.2.1.1; IMC®: 307.2.1.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

[M] 314.2.1.1 Condensate discharge. Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~Condensate drains shall be installed in accordance with Section 802.1.5. Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same *occupancy*, tenant space or *dwelling unit* as the source of the condensate.

2024 International Mechanical Code

307.2.1.1 Condensate discharge. Condensate drains shall not directly connect to any plumbing drain, waste or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. ~~Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture.~~Condensate drains shall be installed in accordance with Section 802.1.5 of the International Plumbing Code. Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same *occupancy*, tenant space or *dwelling unit* as the source of the condensate.

Reason: This proposal is intended to correct an issue that was created by an approved proposal in the IMC. The IMC should never dictate what fixtures are permitted to receive waste or to supersede requirements already in place in the IPC. The allowance by the IMC to connect condensate discharge to a lavatory tailpiece or a bathtub overflow, this proposal was intended to get around requirements in the IPC. The IPC provides all direction necessary to deal with waste discharge including condensate. The stricken language allows for condensate discharge to connect to lavatory tailpiece as well as bathtub overflow connections, these are the two primary fixture to experience blockages due to hair clogs. Striking the language will prevent unintended flooding that would result from such a clog. A blockage wouldn't need to be a complete blockage, it would only need to be sufficient to keep the drain from keeping up with the4 condensate discharge produced by the equipment. Adding "Condensate drains shall be installed in accordance with IPC 802.1.5." provides a more correct path for compliance with the requirements in the IPC. Proposal P119-24, which was approved in CAH #1, clearly puts the authority within the plumbing code to deal with this waste. 802.1.5 Non-potable clear-water waste. Where devices and equipment such as process tanks, filters, drips, and boilers, plumbing appliances, or other mechanical equipment discharge non-potable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air break or an air gap to an approved waste receptor.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Condensate disposal is already required, if anything this proposal will eliminate potential costs associated to damage that could be the result of the current code.

Comment (CAH2)# 397

M21-24

IMC®: SECTION 202, SECTION 313 (New), 313.1 (New), 313.2 (New)

Proposed Change as Submitted

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Mechanical Code

Delete without substitution:

~~**NONCOMBUSTIBLE MATERIAL.** A material that passes ASTM E136.~~

Add new text as follows:

SECTION 313
NONCOMBUSTIBLE MATERIALS

313.1 Testing. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

313.2 Inherently noncombustible materials. Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The definition contained in the 2024 IMC is actually a requirement rather than a definition and ICC definitions should not contain requirements.

In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials, and that concept is consistent with the definition presently in the IMC but that "definition" is actually a requirement, which should be moved out of Chapter 2. Chapter 3 is the chapter for general requirements.

Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

Unless a requirement exists, experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often a confusion in the public mind when considering a material that performs better than typical combustible materials, but should not be considered noncombustible.

This proposal recommends including a correct requirement for what materials shall be considered noncombustible materials and it is to comply with the IBC section 703.3.1. A second section states that a requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry, need to be tested, for example to ASTM E136.

Equivalent proposals are being submitted to the IFC (by FCAC), the IPC, and the IFGC, all of which use noncombustible materials.

Another proposal revises the definitions of "combustible material" in the IMC and IFGC to clarify that the whether a material is or is not noncombustible is the result of a classification. The IBC does not "define" a noncombustible material but contains requirements for such materials.

The language in section 703.3.1 of the IBC reads as follows:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply moves a requirement from a definition into a section where it can be actually applied, without changing the content.

M21-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted for disapproval 14-0. The proponent recommended this proposal for disapproval with a goal to correct the proposal and bring it back to be heard during CAH2.

M21-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202, SECTION 313, 313.1, 313.2

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

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SECTION 313
NONCOMBUSTIBLE BUILDING MATERIALS

313.1 Testing. Noncombustible building materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

Revise as follows:

313.2 ~~Inherently noncombustible materials~~ Testing not required. ~~Inherently noncombustible materials, such as concrete and steel,~~ The following building materials shall not be required to be tested to be acceptable as noncombustible building materials.

1. Steel,

2. Concrete, containing no combustible aggregates or fibers,

3. Masonry, containing no combustible aggregates or fibers,
4. Glass (excluding plastic glazing),
5. 5xxx and 6xxx series aluminum alloys.

Reason: As explained with the original proposal, the IMC definition is actually a requirement which is something that should not be included in ICC definitions. This change sends the requirements to the IBC where the testing requirements are included and takes them out of the definitions section.

Several materials can claim to be inherently noncombustible, in many cases without it being truly valid. For example, any plastic or wood materials are always combustible. This issue is an important consideration for building materials (see for example chapter 6 of the IMC where requirements are different depending on whether the materials are or are not noncombustible.

Some materials exist (often insulation materials) where it is not possible to determine without testing (normally to ASTM E136, as required in the IBC) whether they are truly noncombustible. For example, fiberglass insulation materials will always contain some combustible binder to be useful. The material can pass the ASTM E136 test (and be noncombustible) if it contains a small amount of binder but fail the test with larger amount of binder. That can only be determined by testing and is impossible to note visually.

It makes no sense to test steel, concrete or masonry (if they contain no combustible aggregates or fibers; this would have to be certified by the proponent. Therefore, as it has been shown by testing (and common sense) that testing steel, concrete or masonry to ASTM E136 is unnecessary, as they will pass the test they can be excluded from being required to be tested.

However, some new building materials are made with organic (such as foam plastics) components to lower the weight and make them easier to manipulate. In that case, it is unclear whether they are truly noncombustible materials, and they would need to be tested to know the answer for sure. That is why the requirement has been added that they contain no combustible aggregates or fibers.

Test results from at least two testing labs have been able to show that glass (whether ordinary glass or quartz) truly meets the requirements of ASTM E136 and is a noncombustible material. The same is not true for other glazing materials, which are typically plastic and are combustible; they must be excluded.

That brings up the question of aluminum. Typical building materials are, more often than not, alloys of aluminum and other metals. The Aluminum Association has published a report in Building Safety Journal (August 17th, 2020) where they discuss the “noncombustibility” of aluminum. It is of great interest that the 4 aluminum alloys that they tested “were selected for their widespread use in construction”. Those alloys tested all passed the ASTM E136 test. However, the same report also states that “Aluminum, just like many comparable metals, is not combustible in any general application other than when it is specifically made to be.” That suggests that there may be some aluminum alloys that may or may not be noncombustible. After considerable debate and investigation of test reports, consensus was reached that most of the aluminum alloys used as building materials belong to the 6xxx series of alloys, with less than 1.2% magnesium, and the main ones (such as 6063, 6061, 6005) have all been tested for noncombustibility. In terms of sheet aluminum products, the series 5xxx alloys (such as 5052, 5083, 5005) are often used in construction, with higher levels if magnesium (the highest being 5083, which contains 4.9% magnesium). This product has also been tested and shown to be noncombustible. Therefore, consensus was reached that it is safe to include “5xxx and 6xxx series aluminum alloys” to the list of building materials that do not require testing to be considered noncombustible materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This simply sends the user to the IBC for information on noncombustible materials and is consistent with what the requirements are now, in the definition.

Comment (CAH2)# 108

M22-24

IMC®: 401.1, 401.2, SECTION 403, 403.1, 403.3, 403.3.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3, TABLE 403.3.2.3

Proposed Change as Submitted

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com)

2024 International Mechanical Code

401.1 Scope. This chapter shall govern the ventilation of spaces within a *building* intended to be occupied. Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems and other systems specified in Section 502 shall comply with Chapter 5.

Revise as follows:

401.2 Ventilation required. ~~Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.~~ *Dwelling units* complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 *occupancies* shall be ventilated by mechanical means in accordance with Section 407. Enclosed parking garages shall be ventilated by mechanical means in accordance with Section 404. Every other occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.

SECTION 403
MECHANICAL VENTILATION

Revise as follows:

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* except that mechanical *ventilation air* requirements for *dwelling units* in Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

403.3 Outdoor air and local exhaust airflow rates. *Dwelling units* in Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other spaces within *buildings* intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

Exceptions:

1. Enclosed parking garages complying with Section 404.
2. Spaces in ambulatory care facilities and Group I-2 occupancies complying with Section 407.

403.3.1 Spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies~~Other buildings intended to be occupied~~. The design of local exhaust systems and ventilation systems for outdoor air for spaces ~~*occupancies*~~other than *dwelling units* in Group~~s~~ R-2, R-3 and R-4 occupancies shall comply with Sections 403.3.1.1 through 403.3.1.4.

403.3.2 Dwelling units in Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air for *dwelling units* in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or

combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

where: Q_{OA} = outdoor airflow rate, cfm **(Equation 4-9)**

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The ~~whole-house~~ <u>outdoor air</u> ventilation system is a *balanced ventilation system*.

Delete without substitution:

~~**403.3.2.2 Outdoor air for other spaces.** Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot [0.0003 $m^3/(s \times m^2)$] of floor area.~~

Revise as follows:

~~**403.3.2.3**~~ <u>**403.3.2.2**</u> **Local exhaust.** Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.~~3~~<u>2</u>.

TABLE ~~403.3.2.3~~ <u>403.3.2.2</u> MINIMUM REQUIRED LOCAL EXHAUST RATES FOR <u>DWELLING UNITS IN</u> GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: These modifications are needed to clarify ventilation requirements for sleeping units, dwelling units, and other spaces within Group R-2, R-3, and R-4 occupancies. A summary of the results of the proposed modifications is as follows:

1. All dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.2. This is consistent with the prior IMC cycle's action on proposal M19-21.

2. Where provided with mechanical ventilation, all spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.1 (this is meant to parallel the scope divisions of ASHRAE 62.2 and ASHRAE 62.1), with the exception of enclosed parking garages, ambulatory care facilities, and Group I-2 occupancies are addressed elsewhere.

Section 403.3.2 should be restricted to dwelling units because it is based on ASHRAE 62.2 (whose scope is restricted to dwelling units) and is poorly equipped to address spaces in Group R-2, R-3, and R-4 occupancies that are not dwelling units (e.g., dormitory sleeping

units, public bathrooms, public laundry rooms, exercise rooms, meeting rooms, etc.). There is currently a subsection to address outdoor air requirements for "corridors and other common areas" within Section 403.3.2, but it is not clear how to apply this section to the myriad of spaces that are better addressed in Section 403.3.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal primarily clarifies existing requirements for ventilation.

M22-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 in disapproval of this proposal. The committee argues that, contrary to the proponent's suggestions, this proposal does not make clear the current ventilation requirements.

M22-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202 (New), 401.2, SECTION 403, 403.1, 403.3, 403.3.1, TABLE 403.3.1.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3, TABLE 403.3.2.3

Proponents: Mike Moore, Stator LLC, The Home Ventilating Institute (mmoore@statorllc.com); Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gvijayakumar@swinter.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Mechanical Code

Add new definition as follows:

CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel.

PRIVATE GARAGE. A building or portion of the building in which motor vehicles used by the owner or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

401.2 Ventilation required. ~~Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.~~ *Dwelling units* complying with the air leakage requirements of the *International Energy Conservation Code* or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 *occupancies* shall be ventilated by mechanical means in accordance with Section 407. Enclosed parking garages shall be ventilated by mechanical means in accordance with Section 403. Every other occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.

Exception: Ventilation by mechanical means shall not be required for an enclosed *private garage* serving a single *dwelling unit*.

SECTION 403
MECHANICAL VENTILATION

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* ~~except that mechanical *ventilation air* requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof.~~The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are designed and installed in accordance with Section 403.3.2.1 and Chapter 6.

403.3 Outdoor air and local exhaust airflow rates. *Dwelling units* in Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall be provided with ~~outdoor air~~ *outdoor air* and local exhaust in accordance with Section 403.3.2. Other spaces within *buildings* intended to be occupied shall be provided with ~~outdoor air~~ *outdoor air* and local exhaust in accordance with Section 403.3.1.

403.3.1 Spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies ~~**Other buildings intended to be occupied.**~~ The design of local exhaust systems and *outdoor air* ventilation systems ~~for outdoor air~~ for spaces ~~*occupancies*~~ other than *dwelling units* in Group~~s~~ R-2, R-3, and R-4 *occupancies* shall comply with Sections 403.3.1.1 through 403.3.1.4.

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Hotels, motels, resorts and dormitories ; sleeping units and spaces in Group R-2, R-3, and R-4 occupancies other than dwelling units				
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas	20	5	0.06	—
Kitchens, private[b]	—	—	—	50/100[f]
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	—
Laundry rooms within dwelling units	10	5	0.12	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
~~**Private dwellings, single and multiple**~~				
~~Garages, common for multiple units[b]~~	~~—~~	~~—~~	~~—~~	~~0.75~~
~~Kitchens[b]~~	~~—~~	~~—~~	~~—~~	~~50/100[f]~~
~~Living areas[e]~~	~~Based on number of bedrooms. First bedroom, 2; each additional bedroom, +~~	~~0.35 ACH but not less than 15 cfm/person~~	~~—~~	~~—~~
~~Toilet rooms and bathrooms[g]~~	~~—~~	~~—~~	~~—~~	~~25/50[f]~~
Public spaces				
Toilet rooms — public[g]	—	—	—	50/70[e]
Storage				
Repair garages, enclosed public parking garages[b,d], enclosed *private garages* serving multiple *dwelling units*[b]	—	—	—	0.75

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

d. Ventilation systems in enclosed public parking garages shall comply with Section 404.

403.3.2 Dwelling units in Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and *outdoor air* ventilation systems for ~~outdoor air~~ *dwelling units* in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An *outdoor air* ventilation system shall be installed and shall comply with the following:1. For a *dwelling unit* opening to a *corridor*, *outdoor air* shall be mechanically supplied to the *dwelling unit* through ducts or other equipment that terminate within the *dwelling unit*.2. In Climate Zones 6 through 8, for a *dwelling unit* in a *building* not more than 3 stories in height above grade plane, the *outdoor air* ventilation system shall be a *balanced ventilation system* in compliance with the residential provisions of the *International Energy Conservation Code*. 3. For a *dwelling unit* not addressed by Item 1 or Item 2, *outdoor air* shall be provided using ~~An outdoor air ventilation system consisting of~~ a mechanical ~~exhaust system~~ *exhaust system*, supply system or combination thereof ~~shall be installed for each *dwelling unit*~~. Local exhaust or supply systems, including ~~outdoor air~~ *outdoor air* ducts connected to the return side of an air handler, are permitted to serve as components of such a system. ~~The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.~~

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

~~(Equation 4-9)~~

where: ~~Q_{OA} = outdoor airflow rate, cfm A_{floor} = conditioned floor area, ft^2 N_{br} = number of bedrooms; not to be less than one~~

~~Exceptions:~~

1. ~~The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.~~
2. ~~The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:~~
   - 2.1. ~~A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:~~
     - 2.1.1. ~~Living room.~~
     - 2.1.2. ~~Dining room.~~
     - 2.1.3. ~~Kitchen.~~
   - 2.2. ~~The whole-house ventilation system is a *balanced ventilation system*.~~

403.3.2.2 Outdoor air ~~for other spaces~~ flow rate for dwelling units. ~~Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot [0.0003 m^3/(s × m^2)] of floor area.~~ The *dwelling unit's outdoor air* ventilation system shall be designed to provide the required rate of *outdoor air* continuously during the period that the *building* is occupied. The minimum continuous *outdoor air* flow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

(Equation 4-9)

where: Q_{OA} = *outdoor air* flow rate, cfm A_{floor} = conditioned floor area, ft^2 N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The *outdoor air* ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average *outdoor air* flow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   - 2.1. A ducted system supplies *outdoor air* directly to each bedroom and to one or more of the following rooms:
     - 2.1.1. Living room.
     - 2.1.2. Dining room.
     - 2.1.3. Kitchen.
   - 2.2. The *outdoor air* ventilation system is a *balanced ventilation system*.

403.3.2.3 Local exhaust. Local exhaust systems shall be provided in kitchens, ~~bathrooms~~ *bathrooms*, and ~~toilet rooms~~ *toilet rooms* and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR DWELLING UNITS IN GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
~~Bathrooms~~ *Bathrooms* and ~~toilet rooms~~ *toilet rooms*	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason: These modifications are needed to clarify ventilation requirements for dwelling units and other spaces within Group R-2, R-3, and R-4 occupancies. Additionally, based on direction received from the mechanical committee at CAH#1, this proposal has been combined with M28 and the committee's action on M8, M14, and M30. The committee requested that such an omnibus proposal be developed to better align with their actions on these interrelated proposals. In an effort to develop consensus, this proposal has been shared with all parties who opposed M28 at the first committee hearings; no negative feedback was received.

A summary of the results of the public comment version of this proposal is as follows:

1. All dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.2. This is consistent with the prior IMC cycle's action on proposal M19-21.

2. Where provided with mechanical ventilation, all spaces other than dwelling units in Group R-2, R-3, and R-4 occupancies shall comply with Section 403.3.1 (this is meant to parallel the scope divisions of ASHRAE 62.2 and ASHRAE 62.1), with the exception of ambulatory care facilities and Group I-2 occupancies, which are addressed in Section 407.

3. To align with ASHRAE 62.2 and action taken by the committee at CAH#1 on M8, outdoor air shall be mechanically supplied to dwelling units opening to a corridor in Groups R-2, R-3, and R-4 occupancies.

4. To align with IBC Section 406.6.2 and action taken by the committee at CAH#1 on M14, enclosed private garages serving multiple dwelling units are required to have mechanical ventilation in accordance with IMC Section 403.

5. To align with Section 403.3.2.1 of the IECC-R and action taken by the committee at CAH#1 on M30, require a *balanced ventilation system* for low-rise dwelling units in Climate Zones 6, 7, and 8.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal is editorial in nature or is a clarification of existing requirements and has no cost impact on the cost of construction. The exception is the inclusion of the language from M8, the cost impact for which is located within that proposal.

Comment (CAH2)# 587

M28-24

IMC®: CHAPTER 4, SECTION 403, 403.3, 403.3.1, TABLE 403.3.1.1, 403.3.2, 403.3.2.1, 403.3.2.2, 403.3.2.3, TABLE 403.3.2.3, 403.3.2.4, 403.3.2.5

Proposed Change as Submitted

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gayathri@swinter.com)

2024 International Mechanical Code

CHAPTER 4
VENTILATION

SECTION 403
MECHANICAL VENTILATION

Revise as follows:

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other *occupancies* ~~*buildings* intended to be occupied~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for *occupancies* other than Groups R-2, R-3 and R-4 shall comply with Sections 403.3.1.1 through 403.3.1.4.

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT^2 [a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_aCFM/FT^2 [a]	EXHAUST AIRFLOW RATE CFM/FT^2 [a]
Hotels, motels, and resorts ~~and dormitories~~				
Bathrooms/toilet—private[g]	—	—	—	25/50[f]
Kitchens - private[b]	—	—	—	50/100[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
~~Dormitory sleeping areas~~	~~20~~	~~5~~	~~0.06~~	—
Gambling casinos	120	7.5	0.18	—
Laundry rooms, central	10	5	0.12	—
~~Laundry rooms within dwelling units~~	~~10~~	~~5~~	~~0.12~~	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
~~Private dwellings, single and multiple~~				
~~Garages, common for multiple units[b]~~	—	—	—	~~0.75~~
~~Kitchens[b]~~	—	—	—	~~50/100[f]~~
~~Living areas[c]~~	~~Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1~~	~~0.35 ACH but not less than 15 cfm/person~~	—	—
~~Toilet rooms and bathrooms[g]~~	—	—	—	~~25/50[f]~~

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \times m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

a. Based on net occupiable floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404.

e. Rates are per water closet , urinal or adult changing station. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.

g. Mechanical exhaust is required and recirculation from such spaces is prohibited. For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.

i. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission of airborne viruses, bacteria and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

l. The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage or designated palletized storage floor areas.

403.3.2 Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

Revise as follows:

403.3.2.1 Outdoor air for dwelling units and sleeping units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit* and *sleeping unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the *building* is

occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.03A_{floor} + 7.5(N_{br} + 1)$$

where: Q_{OA} = outdoor airflow rate, cfm **(Equation 4-9)**

A_{floor} = conditioned floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:
   2.1. A ducted system supplies *ventilation air* directly to each bedroom and to one or more of the following rooms:
      2.1.1. Living room.
      2.1.2. Dining room.
      2.1.3. Kitchen.
   2.2. The ~~whole-house~~ outdoor air ventilation system is a *balanced ventilation system*.

403.3.2.2 Outdoor air and local exhaust for other spaces. Spaces other than *dwelling units* and *sleeping units* shallcomply with Sections 403.3.1.1 through 403.3.1.4~~Corridors and other common areas within the conditioned space shall be provided with outdoor air at a rate of not less than 0.06 cfm per square foot [0.0003 $m^3/(s \times m^2)$] of floor area~~.

403.3.2.3 Local exhaust for dwelling units and sleeping units. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

TABLE 403.3.2.3 MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Revise as follows:

403.3.2.4 System controls. Where provided within a *dwelling unit*or *sleeping unit*, controls for outdoor air ventilation systems shall include text or a symbol indicating the system's function.

403.3.2.5 Ventilating equipment. Fans providing exhaust or outdoor air shall be *listed* and *labeled* to provide the minimum required air flow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.

Reason: For Residential Group R-2, R-3 and R-4, 2024 IMC made an important change to have the same ventilation and exhaust requirements, regardless of building height.

However, it is not clear by the charging language in R403.3 and R403.3.1 what ventilation requirements are if the building exceeds 3 stories. It seems that R403.3.2 is intended to apply to all R-2, R-3 and R-4, regardless of building height, so this proposal makes that intent more explicit.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not intended to change stringency of requirements, but rather clarify the current requirements for all the occupancies within a multifamily building, regardless of building height.

M28-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of the proposal. The committee reasoning is that the proponent does not explicitly make it clear in the charging language in R403.3 and R403.3.1 what the ventilation requirements are if the building exceeds 3 stories. The committee suggests that the proponent work on the proposal and resubmit it to be heard at the CAH2.

M28-24

Individual Consideration Agenda

Comment 1:

IMC®: CHAPTER 4, SECTION 403, 403.3, 403.3.2

Proponents: Gayathri Vijayakumar, Steven Winter Associates, Inc., Steven Winter Associates, Inc. (gvijayakumar@swinter.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Mechanical Code

CHAPTER 4
VENTILATION

SECTION 403
MECHANICAL VENTILATION

Revise as follows:

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3, and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other *buildings* intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.3.2 Group R-2, R-3 and R-4 occupancies. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* shall comply with Sections 403.3.2.1 through 403.3.2.5.

Reason: I submitted the original code change proposal to complete a code change proposal that was successful in 2024 IMC (which removed the 3 story language in 403.3.2).

This comment replaces the original code change proposal (M-28). It now just contains the same strikeout in 403.3 as was struck in

403.3.2 in the previous cycle.
This creates alignment with 403.3.1 and 403.3.2. Without this edit, there are no charging requirements for Group R-2, R-3, or R-4 occupancies greater than 3 stories, since they are not within the scope of either 403.3.1 or 403.3.2.

While the other changes originally proposed would provide better clarity in this section, those are being submitted as a separate comment and this is submitted as the "back-up" if that fails.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial. Trying to maintain the intent from the prior code cycle that all Group R-2, R-3 and R-4 occupancies are required to meet 403.3.2.

Comment (CAH2)# 246

M37-24

IMC®: [F] 502.4, [F] 502.5

Proposed Change as Submitted

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

THIS PROPOSAL WILL BE HEARD BY THE IFC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Mechanical Code

Revise as follows:

[F] 502.4 ~~Stationary storage battery~~ Energy storage systems. ~~Stationary storage battery~~ Energy storage systems (ESS) shall be regulated and ventilated in accordance with Section 1207.6.1 of the International Fire Code and the general requirements of this chapter.

Delete without substitution:

~~[F] 502.5 Ventilation of battery systems in cabinets.~~ ~~Stationary storage battery systems installed in cabinets shall be provided with ventilation in accordance with Section 502.4.~~

Reason: The terminology "battery storage systems" is outdated. This proposed change updates the language to utilize the current terminology found throughout the ICC code books - Energy Storage Systems (ESS). This change also removes section 502.5, as it is redundant - section 502.4 covers all ESS, including ones in cabinets.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change is editorial only - changing terminology and removing redundant provisions.

M37-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved based upon the action on F4-24. (Vote 14-0)

M37-24

Individual Consideration Agenda

Comment 1:

IMC®: [F] 502.4

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

[F] 502.4 Electrochemical energy storage systems. Electrochemical energy storage systems (ESS) shall be regulated and ventilated in accordance with Section 1207.6.1 of the International Fire Code and the general requirements of this chapter.

Reason: This modification incorporates committee comments on the original proposal - specifically, that the language as originally proposed was too broad and electrical energy should be specified. The modification changes the language to specify electrochemical energy storage systems, which conforms to the definitions included in the IBC and IFC, which include both battery and capacitor storage systems..

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This modification simply changes the terminology slightly, and does not change any code provisions.

Comment (CAH2)# 455

M39-24

IMC®: 504.2, 504.2.1 (New)

Proposed Change as Submitted

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Mechanical Code

Revise as follows:

504.2 Exhaust penetrations. Where a clothes dryer exhaust duct penetrates a non-fire-resistance rated wall or ceiling membrane, the annular space shall be sealed with noncombustible material, *approved* fire caulking or a noncombustible dryer exhaust duct wall receptacle. ~~Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draftstops or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International Building Code.*~~ *Fire dampers*, *combination fire/smoke dampers* and any similar devices that will obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

Add new text as follows:

504.2.1 Ducts penetrating fire resistance rated assemblies, fireblocks or draftstops. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draft stopping or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless it complies with one of the following:

1. The duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating of any wall, floor/ceiling or other assembly required by the International Building Code to be fire- resistance rated is*maintained in accordance with Chapter 7 of the International Building Code.*
2. Ducts that are continuously covered on all sides from the point at which the duct penetrates the membrane of a wall or ceiling to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose, in accordance with nationally recognized standards. The required fire resistance-rating shall be equal to the fire-resistance rating of the assembly being penetrated.

Reason: This proposal does several things. First, it reformats the paragraph and separates the individual criteria for better clarity. It also better differentiates the requirements based on whether the wall or ceiling is fire resistance rated, or not. Lastly, the proposal provides an additional option for ducts that penetrate fire resistance rated walls and floors. Third-party certification organizations like UL and Intertek provide listing and labelling services for fire-resistant duct systems using a variety of nationally recognized Standards and applicable ICC-ES criteria. These Listings have been in the marketplace for many years and have proven their effectiveness.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

M39-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of this proposal 12-2. The committee's reasoning was that the proponent only referenced the nationally recognized standards without being specific.

M39-24

Individual Consideration Agenda

Comment 1:

IMC®: 504.2, 504.2.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

504.2 Exhaust penetrations. Where a clothes dryer exhaust duct penetrates a non-fire-resistance rated wall or ceiling membrane, the annular space shall be sealed with noncombustible material, *approved* fire caulking or a noncombustible dryer exhaust duct wall receptacle. ~~Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draftstops or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International Building Code.*~~ *Fire dampers*, *combination fire/smoke dampers* and any similar devices that will obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

504.2.1 Ducts penetrating fire resistance rated assemblies, fireblocks or draftstops. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draft stopping or any wall, floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance rated, unless it complies with one of the following:

1. The duct is constructed of galvanized steel or aluminum of the thickness specified in Section 603.4 and the fire-resistance rating of any wall, floor/ceiling or other assembly required by the International Building Code to be fire- resistance rated is*maintained in accordance with Chapter 7 of the International Building Code.*
2. Ducts that are continuously covered on all sides from the point at which the duct penetrates the membrane of a wall or ceiling to the outlet terminal with a classified, listed and labeled system specifically evaluated for such purpose, tested ~~in accordance with nationally recognized standards.~~ using the standard time-temperature curve of ASTM E119 or UL 263. The required fire resistance-rating shall be equal to the fire-resistance rating of the assembly being penetrated.

Reason: During CAH#1, the committee indicated that the reason for disapproval was that the proposal was not specific enough because it did not reference a test Standard to be used. This updated text includes a specific reference to ASTM E119 and UL 263. This fire exposure has been used to evaluate the ability of a duct system to resist the spread of fire between vertical or horizontal compartments for many years.

Bibliography: [1]ASTM E2816-20a, Standard Test Methods for Fire Resistive Metallic HVAC Duct Systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an additional option for protection of ducts. It does not remove any existing provisions or mandate additional costs.

M40-24

IMC®: 506.3 (New), ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca)

2024 International Mechanical Code

Add new text as follows:

506.3.1 Special inspection and test requirements. Commercial kitchen grease ducts serving Type I hoods conforming to the provisions of Section 506.3.11 that are listed and labeled to the requirements of 506.3.11.2 or 506.3.11.3 shall undergo special inspection by an approved agency in accordance with ASTM WK70806.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM WK70806 Standard Practice for On-Site Inspection of Fire Resistive Duct Systems

Reason: Commercial kitchen operations are consistently one of the leading causes of non-residential fires reported in the United States. Until recently, there has been no document produced in the industry that is a consensus of the manufacturers, installation contractors, and inspection agencies. The new ASTM Standard is a key document that provides a standard set of procedures for inspecting and reporting on the installed fire resistive duct systems. At the time of submission, the ASTM WK70806*, Standard Practice for On-Site Inspection of Fire Resistive Duct Systems* had not been published, but has gone through the full ASTM process and is awaiting final publication.

This Standard Practice provides a means to verify compliance of the installed fire resistive duct system to the inspection document, and requires all information contained in the inspection document to be submitted to the Authorizing Authority having jurisdiction. It establishes procedure to inspect products and systems, including methods for field verification and inspection.

Bibliography: ASTM WK70806, Standard Practice for On-Site Inspection of Fire Resistive Duct Systems, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

There are multiple jurisdictions that already require commercial grease duct inspections. The estimated cost is lower for instances where multiple duct inspections could be coordinated in the same time period, or for projects of low complexity. For those jurisdictions that already require duct inspection, the anticipated costs would be much lower as this proposal would be a replacement of existing requirements rather than an additional item.

Estimated Immediate Cost Impact Justification (methodology and variables):

For jurisdictions that do not currently require fire-resistant duct inspections, the anticipated cost increase for this proposal is between $1000 to $1500 per duct system inspected.

M40-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove of the proposal 12-2. The committee's reasoning is that this proposal does not establish procedures to inspect products and systems, including methods for field verification and inspection.

M40-24

Individual Consideration Agenda

Comment 1:

IMC®: 506.3.1, ASTM Chapter 15 (New)

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., International Firestop Council (tcrimi@sympatico.ca) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

506.3.1 Special inspection and test requirements. Commercial kitchen grease ducts serving Type I hoods conforming to the provisions of Section 506.3.11 that are listed and labeled to the requirements of 506.3.11.2 or 506.3.11.3 shall undergo special inspection by an approved agency in accordance with ASTM ~~WK70806~~ E3385..

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

E3385-24 Standard Practice for On-Site Inspection of Fire Resistive Duct Systems

Reason: During CAH#1, the Committee stated that the proposal does not establish procedures to inspect products and systems, including methods for field verification and inspection. However, referencing this new Standard Practice will establish those procedures. The scope of the practice states:1.1 This practice covers a standard set of procedures for inspecting and reporting on the installed fire resistive duct systems.1.2 This practice establishes procedures to inspect products and systems, including methods for field verification and inspection.1.3 This practice provides an inspector and inspection body, various methods to verify that required systems have been installed in accordance with the inspection document.

The Standard is a key document that provides a standard set of procedures for inspecting and reporting on the installed fire resistive duct systems and does provide a means to verify compliance of the installed fire resistive duct system to the inspection document.

At the time of submission to CAH#1, the Standard had been fully balloted, but ASTM had not assign a Standard number. The only change to this proposal is to update the number of the Standard to the published version. No other technical changes were made to what was reviewed in ASTM WK70806.

Cost Impact: Increase

Estimated Immediate Cost Impact:

There are multiple jurisdictions that already require commercial grease duct inspections. The estimated cost is lower for instances where multiple duct inspections could be coordinated in the same time period, or for projects of low complexity. For those jurisdictions that already require duct inspection, the anticipated costs would be much lower as this proposal would be a replacement of existing requirements rather than an additional item.

Estimated Immediate Cost Impact Justification (methodology and variables):

For jurisdictions that do not currently require fire-resistant duct inspections, the anticipated cost increase for this proposal is between $1000 to $1500 per duct system inspected.

Comment (CAH2)# 433

NOTE: M44-24 PART I DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

M44-24 Part I

IMC®: 513.1

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Mechanical Code

Revise as follows:

513.1 General. Energy and heat recovery ventilation systems shall be installed in accordance with this section. Where required for purposes of energy conservation, energy and heat recovery ventilation systems shall also comply with the *International Energy Conservation Code* . Ducted energy and heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1812. Nonducted energy and heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1815.

Reason: The common industry terms for the equipment covered by these requirements are “Energy Recovery Ventilators (ERVs)” and “Heat Recovery Ventilators (HRVs)”. The primary difference is that ERVs have moisture permeable heat exchangers to facilitate both sensible and latent heat transfer between the air streams. HRV’s have nonpermeable heat exchangers, and thus only facilitate sensible heat transfer. Both ERVs and HRVs are in scope of the referenced standards. This proposal aligns the code terminology with industry, the IECC, and the IRC to improve clarity. This clarifies that safety requirements always apply independently of energy conservation requirements of IECC. This clarifies that this section does not mandate installation, but provides requirements where installed.

Correlates IRC with mechanical code requirements (Section 514). Chapter 11 of IRC contains energy efficiency related requirements for this equipment (see N1103.6.1), however the main body of code does not contain safety requirements for this equipment.

This equipment is becoming more common in construction. M1301.1 already requires that equipment not covered by this code refer to the IMC. This equipment is covered by 514.1 of the IMC. By also adding these requirements into the body of the IRC, it assists the user in applying code requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial, clarifies existing requirements in the IMC, and also incorporates the updated text into the IRC for ease of use.

For the IRC: E3403.3 already requires listing of electrical equipment, while this proposal clarifies the specific listing standards. IRC M1301.1 points to the IMC for requirements for equipment not covered, and the IMC already includes these requirements. Additionally the IRC, Section M1302.1, requires appliances regulated by the IRC be listed and labeled for the application.

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
513.1 General.

Energy recovery ventilators (ERVs) and heat recovery ~~ventilation systems~~ ventilators (HRVs) shall be installed in accordance with this section. Where required for purposes of energy conservation, ~~energy and heat recovery ventilation systems~~ ERVS and HRVs shall also comply with the *International Energy Conservation Code* . Ducted ~~energy and heat recovery ventilators~~ ERVs and HRVs shall be *listed* and *labeled* in accordance with UL 1812. Nonducted ~~energy and heat recovery ventilators~~ ERVs and HRVs shall be *listed* and *labeled* in accordance with UL 1815.

Committee Reason: The committee voted to approve this proposal as modified by 14-0. The proposal further clarifies the relationship between energy and heat recovery ventilation systems. The IRC approved this proposal previously.

M44-24 Part I

M44-24 Part II

IRC: SECTION M1905 (New), M1905.1 (New), UL Chapter 44 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

SECTION M1905
ENERGY AND HEAT RECOVERY VENTILATION SYSTEMS

M1905.1 General. Energy and heat recovery ventilation systems shall be installed in accordance with this section. Where required for purposes of energy conservation, energy and heat recovery ventilation systems shall also comply with Chapter 11. Ducted energy and heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1812. Nonducted energy and heat recovery ventilators shall be listed and labeled in accordance with UL 1815.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1812-2013	Ducted Heat Recovery Ventilators - with revisions through May 3, 2022
1815-2012	Nonducted Heat Recovery Ventilators - with revisions December 7, 2021

Reason: The common industry terms for the equipment covered by these requirements are “Energy Recovery Ventilators (ERVs)” and “Heat Recovery Ventilators (HRVs)”. The primary difference is that ERVs have moisture permeable heat exchangers to facilitate both sensible and latent heat transfer between the air streams. HRV’s have nonpermeable heat exchangers, and thus only facilitate sensible heat transfer. Both ERVs and HRVs are in scope of the referenced standards. This proposal aligns the code terminology with industry, the IECC, and the IRC to improve clarity. This clarifies that safety requirements always apply independently of energy conservation requirements of IECC. This clarifies that this section does not mandate installation, but provides requirements where installed.

Correlates IRC with mechanical code requirements (Section 514). Chapter 11 of IRC contains energy efficiency related requirements for this equipment (see N1103.6.1), however the main body of code does not contain safety requirements for this equipment.

This equipment is becoming more common in construction. M1301.1 already requires that equipment not covered by this code refer to the IMC. This equipment is covered by 514.1 of the IMC. By also adding these requirements into the body of the IRC, it assists the user in applying code requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial, clarifies existing requirements in the IMC, and also incorporates the updated text into the IRC for ease of use.

For the IRC: E3403.3 already requires listing of electrical equipment, while this proposal clarifies the specific listing standards. IRC M1301.1 points to the IMC for requirements for equipment not covered, and the IMC already includes these requirements. Additionally the IRC, Section M1302.1, requires appliances regulated by the IRC be listed and labeled for the application.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted to disapprove this proposal with a vote of 6-3. The committee argued that the 1st sentence of the proposal failed to meet the code requirements and does not properly list the specific area of the section.

M44-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: M1905.1, M1905.2 (New), M1905.3 (New), UL Chapter 44

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

M1905.1 General. Energy recovery ventilators (ERVs) and heat recovery ventilators (HRVs) ~~ventilation systems~~ shall be installed in accordance with this section. ~~Where required for purposes of energy conservation, energy and heat recovery ventilation systems shall also comply with Chapter 11. Ducted energy and heat recovery ventilators shall be *listed* and *labeled* in accordance with UL 1812. Nonducted energy and heat recovery ventilators shall be listed and labeled in accordance with UL 1815.~~

Add new text as follows:

M1905.2 Installation. ERVs and HRVs shall be installed in accordance with the manufacturer's installation instructions. Where required for purposes of energy conservation, ERVs and HRVs shall also comply with Chapter 11.

M1905.3 Equipment listings. Ducted ERVs and HRVs shall be *listed* and *labeled* in accordance with UL 1812. Nonducted ERVs and HRVs shall be *listed* and *labeled* in accordance with UL 1815.

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

1812-2013	Ducted Heat Recovery Ventilators - with revisions through May 3, 2022
1815-2012	Nonducted Heat Recovery Ventilators - with revisions December 7, 2021

Reason: The original proposal has been adjusted based on committee feedback in CAH1 regarding editorial formatting. The original proposal referenced "this section" but the requirements were formatted as a single paragraph. This public comment shows a reformatting as a proper section, which improves code usability and addresses the editorial concerns. It also incorporates the changes from floor modification M44-24 Part II-Roberts MP2 to clarify ERV/HRV terminology. A reference to the manufacturer's installation instructions was added under M1905.2 to clarify the installation requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Editorial, clarifies existing requirements. E3403.3 already requires listing of electrical equipment, while this proposal clarifies the specific listing standards. Additionally, IRC M1301.1 points to the IMC for requirements for equipment not covered, and the IMC already includes these requirements.

Comment (CAH2)# 481

NOTE: M47-24 PART I DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

M47-24 Part I

IMC®: 603.9.1 (New), UL Chapter 15 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Mechanical Code

Add new text as follows:

603.9.1 Collars and sleeves. Nonmetallic collars and sleeves used to join or attach flexible air ducts and air connectors shall be *listed* and *labeled* in accordance with UL 181C

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

181C-2020 Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors

Reason: UL 181C, Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors, was developed to evaluate non-metal accessories, such as collars and sleeves, used to join or attach flexible air ducts and air connectors that comply with the requirements of UL 181, Factory-Made Air Ducts and Air Connectors.

As defined in UL 181C, a collar is a non-metal accessory used to join flexible air ducts and air connectors at their terminations to other portions of the air duct system. A sleeve is defined as a non-metal accessory used to join sections of flexible air ducts or air connectors.

The requirements for these collars and sleeves include all the applicable requirements that would be applied to factory-made air ducts (UL 181) and discrete products within plenums (UL 2043).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This does not increase of decrease cost. This does not mandate the use of these collars and sleeves. This is providing an alternative to existing methods for connecting flexible air ducts and air connectors. The proposal sets the base safety and performance requirements if these nonmetallic collars and sleeves are used.

Listing for heat pump heaters regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

M47-24 Part I

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
603.9.1 Collars and sleeves.

Nonmetallic collars and sleeves used to join or attach flexible air ducts and air connectors shall be *listed* and *labeled* in accordance with UL 181C.
Exception: Collars that are a component of a listed *appliance*.

Committee Reason: The committee voted 14-0 to approve of this proposal as modified. The proposal recognizes that an installed collar has already been tested per the manufacturer's outline of investigation for specific fire tests on collars and sleeves supplied for fire ducts. The purpose of UL 181C, the Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors, is to assess non-metal accessories, like sleeves and collars, used to join or attach flexible air ducts and air connectors that meet UL 181 specifications. As described in UL 181C, a collar is a non-metal accessory that connects flexible air ducts and air connections to other system parts at their termination. Any non-metal attachment used to link segments of flexible air ducts or air connectors is called a sleeve.

M47-24 Part I

M47-24 Part II

IRC: M1601.1.1, UL Chapter 44 (New)

Proposed Change as Submitted

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Revise as follows:

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Nonmetallic collars and sleeves used to join or attach flexible air ducts, shall be *listed* and *labeled* in accordance with UL 181C
4. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.*

~~4~~ 5. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.

~~5~~ 6. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.

~~6~~ 7. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.

~~7~~ 8. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

- ~~7~~ 8.1. These cavities or spaces shall not be used as a plenum for supply air.
- ~~7~~ 8.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
- ~~7~~ 8.3. Stud wall cavities shall not convey air from more than one floor level.
- ~~7~~ 8.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.
- ~~7~~ 8.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
- ~~7~~ 8.6. Building cavities used as plenums shall be sealed.

~~8~~ 9. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

181C-2020 Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors

Reason: UL 181C, Outline of Investigation for Non-Metal Joining Accessories for Flexible Air Ducts and Air Connectors, was developed to evaluate non-metal accessories, such as collars and sleeves, used to join or attach flexible air ducts and air connectors that comply with the requirements of UL 181, Factory-Made Air Ducts and Air Connectors.

As defined in UL 181C, a collar is a non-metal accessory used to join flexible air ducts and air connectors at their terminations to other portions of the air duct system. A sleeve is defined as a non-metal accessory used to join sections of flexible air ducts or air connectors.

The requirements for these collars and sleeves include all the applicable requirements that would be applied to factory-made air ducts (UL 181) and discrete products within plenums (UL 2043).

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This does not increase of decrease cost. This does not mandate the use of these collars and sleeves. This is providing an alternative to existing methods for connecting flexible air ducts and air connectors. The proposal sets the base safety and performance requirements if these nonmetallic collars and sleeves are used.

Listing for heat pump heaters regulated by this section of the code is currently required by this code, so there is no cost impact. The proposal is a simple editorial revision to the correct (current) product standard.

M47-24 Part II

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: 2024 International Residential Code

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Where ~~N~~nonmetallic collars and sleeves are used to join or attach flexible air ducts, they shall be *listed* and *labeled* in accordance with UL 181C
4. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.*
5. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
6. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
7. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.

8. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

    8.1. These cavities or spaces shall not be used as a plenum for supply air.

    8.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.

    8.3. Stud wall cavities shall not convey air from more than one floor level.

    8.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.

    8.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

    8.6. Building cavities used as plenums shall be sealed.

9. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Committee Reason: The committee approved this proposal as modified with a vote of 8-1. The committee reasons that this proposal adds another option for installers to use. The modification clarifies when it is mandatory or not.

M47-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: M1601.1.1

Proponents: Mike Moore, Stator LLC, Broan-NuTone (mmoore@statorllc.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Residential Code

M1601.1.1 Above-ground duct systems. Above-ground *duct systems* shall conform to the following:

1. *Equipment* connected to *duct systems* shall be designed to limit discharge air temperature to not greater than 250°F (121°C).
2. Factory-made ducts shall be *listed* and *labeled* in accordance with UL 181 and installed in accordance with the manufacturer's instructions.
3. Where nonmetallic collars and sleeves are used to join or attach flexible air ducts, they shall be *listed* and *labeled* in accordance with UL 181C. **Exception:** Collars that are a component of a *listed appliance.*
4. Fibrous glass duct construction shall conform to the *SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.*
5. Field-fabricated and shop-fabricated metal and flexible duct constructions shall conform to the *SMACNA HVAC Duct Construction Standards—Metal and Flexible* except as allowed by Table M1601.1.1. Galvanized steel shall conform to ASTM A653.
6. The use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.

7. *Duct systems* shall be constructed of materials having a *flame spread index* of not greater than 200.
8. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
    8.1. These cavities or spaces shall not be used as a plenum for supply air.
    8.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
    8.3. Stud wall cavities shall not convey air from more than one floor level.
    8.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting *fireblocking* in accordance with Section R302.11. *Fireblocking* materials used for isolation shall comply with Section R302.11.1.
    8.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
    8.6. Building cavities used as plenums shall be sealed.
9. Volume dampers, equipment and other means of supply, return and exhaust air adjustment used in system balancing shall be provided with access.

Reason: The committee voted 14-0 to approve this same exception to Part 1 of this proposal, based on the rationale that collars that are a component of a listed appliance are already addressed by the fire testing required in accordance with the appliance's safety listing. For consistency, the same exception should be applied to Part 2 of this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed exception clarifies that the requirement does not apply to collars that are a component of a listed appliance. There is no effect on the cost of construction.

Comment (CAH2)# 745

M50-24

IMC®: CHAPTER 6, SECTION 608, 608.1, CHAPTER 15, 15 SMACNA, SMACNA Chapter 15 (New)

Proposed Change as Submitted

Proponents: Eli Howard, SMACNA, SMACNA (ehoward@smacna.org)

2024 International Mechanical Code

CHAPTER 6
DUCT SYSTEMS

SECTION 608
BALANCING

Revise as follows:

608.1 Balancing. Air distribution, ventilation and exhaust systems shall be provided with means to adjust the system to achieve the design airflow rates and shall be balanced by an *approved* method in accordance with SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, or equivalent.. *Ventilation air* distribution shall be balanced by an *approved* method in accordance with SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, or equivalent. and such balancing shall verify that the air distribution system is capable of supplying and exhausting the airflow rates required by Chapter 4.

CHAPTER 15
REFERENCED STANDARDS

Revise as follows:

SMACNA

Sheet Metal and Air Conditioning Contractors' National Association, Inc.
4201 Lafayette Center Drive
Chantilly, VA 20151-1219

2023 HVAC SYSTEMS TESTING, ADJUSTING & BALANCING, FOURTH EDITION

Reason: Balancing is currently required by the IMC, and this document would provide proper procedures for compliance to the code requirements.

Bibliography: SMACNA HVAC Testing, Adjusting & Balancing Manual 4th edition 2023.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Balancing of HVAC Systems is currently required by the IMC, and this would just provide a specific standard of procedure to follow.

M50-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 9-4 to disapprove of this proposal. The committee believes that more thought needs to go into the arrangement of the proposed code language.

M50-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 608, 608.1, RESNET (New)

Proponents: Eli Howard, SMACNA, SMACNA (ehoward@smacna.org); Mike Moore, Stator LLC, The Home Ventilating Institute (mmoore@statorllc.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

SECTION 608
BALANCING

Revise as follows:

608.1 Balancing. Air distribution, ventilation and exhaust systems shall be provided with means to adjust the system to achieve the design airflow rates and shall be balanced by an *approved* method in accordance with the SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, ANSI/RESNET/ICC 380 or equivalent. ~~*Ventilation air* distribution shall be balanced by an *approved* method in accordance with SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, or equivalent. and such balancing~~ Balancing shall verify that the air distribution system is capable of supplying and exhausting the airflow rates required by Chapter 4.

RESNET

Residential Energy Services Network
P.O. Boc 4561
Oceanside, CA 92052-4561
United States

ANSI/RESNET/ICC 380-2022 Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems

Reason: Based on Committee Action in CAH1, this has been modified to address those comments in accordance with the SMACNA HVAC Systems Testing, Adjusting, and Balancing Manual, ANSI/RESNET/ICC 380 or equivalent.

Bibliography: SMACNA HVAC Testing, Adjusting & Balancing Manual 4th edition 2023

ANSI/RESNET/ICC 380-2019 Standard for Testing Airtightness of Building, Dwelling Unite, and Sleeping Unit Enclosures: Airtightness of Heating and Colling Air Distribution Systems: and Airflow of Mechanical Systems

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The IMC clearly mandates balancing of the HVAC Systems via Section 608.1 but does not provide the accepted Industry Standards to accomplish this requirement. The inclusion of the SMACNA & ANSI/RESNET/ICC standards provides the industry accepted methods for

the adequate balancing of HVAC Systems.

Comment (CAH2)# 648

M51-24

IMC®: 801.20

Proposed Change as Submitted

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting

2024 International Mechanical Code

Revise as follows:

801.20 Plastic vent joints. Plastic pipe and fittings used to vent *appliances* shall be installed in accordance with the *appliance* manufacturer's installation instructions and with the installation instructions of the manufacturer of the venting pipe and fittings.

Reason: As part of the certification process, venting piping systems must include installation instructions, as required by UL 1738. Therefore, the proposed new text is making users of the IMC, including tradespersons, aware that the pipe and fittings used for venting must be installed in accordance with the installation instructions of the piping manufacturer.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only adds a statement for clarity.

M51-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 9-5 to disapprove of this code proposal. The installation per UL 1738 is being proposed. The committee argues that this provision is between the manufacturer of the pipe and the manufacturer of the appliances.

M51-24

Individual Consideration Agenda

Comment 1:

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com) requests As Submitted

Reason: PPFA believes it is reasonable for this code to give pipe and fitting manufactures input on how their products are used in this application. Not all materials are suited and some instructions may be useful.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment 2:

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting requests As Submitted

Reason: The committee reason for disapproving proposal M51-24 indicated that the vent installation is a matter between the manufacturer of the pipe and the manufacturer of the appliance. However, there is no relationship between the appliance and pipe manufacturers. Current practice is that the appliance manufacturer specifies the vent material when in fact they have no expertise in the manufacture and application of venting products and assume no liability for such products —venting products are manufactured by pipe and fittings manufacturers—.
The intent of the original M51 proposal was to require that the venting products be installed in accordance with the instructions of the manufacturer with the expertise for such products, which is of course the pipe and fittings manufacturer.
It is also important to note that there was no mention of UL 1738 in the original M51 proposal; UL 1738 was only mentioned in the supporting rationale.
We request that proposal M51-24 be approved as submitted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

M63-24

IMC®: 1101.1.1

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1101.1.1 Refrigerants other than ammonia. *Refrigeration systems* using a refrigerant other than ammonia shall comply with this chapter, ASHRAE 15 and the *International Fire Code*. *Refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IIAR CO2 or be part of listed and labeled equipment.

Reason: The scope of IIAR CO2 specifically excludes “Listed equipment or systems.” There are many listed refrigeration systems using carbon dioxide as the refrigerant. Field erected systems may also be evaluated by NRTLs to existing industry safety standards, such as UL 60335-2-40, UL 60335-2-89, and UL 471.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is only meant to address an inconsistency in order to maintain the intent of the scope.

M63-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 13-1 to disapprove of this proposal. The committee's reasoning is that there is no need to add this proposed code language to this section of the IMC.

M63-24

Individual Consideration Agenda

Comment 1:

IMC®: 1101.1.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Mechanical Code

1101.1.1 Refrigerants other than ammonia. *Refrigeration systems* using a refrigerant other than ammonia shall comply with this

chapter, ASHRAE 15 and the *International Fire Code*. Where not listed and labeled, ~~*P*~~*refrigeration systems* containing carbon dioxide as the refrigerant shall also comply with IIAR CO2~~ or be part of listed and labeled equipment~~.

Reason: As written, the language in 1101.1.1 prohibits the use of listed CO2 systems, as the scope of IIAR CO2 excludes listed systems and equipment. Therefore, no listed equipment complies with IIAR CO2, and can not be installed based on the existing language. The proposed language is intended to correct this conflict.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed change is simply to correctly distinguish between what is covered by the i-codes and ASHRAE 15 in contrast to IIAR CO2. It does not change anything about installation requirements that were not already established.

Comment (CAH2)# 299

M64-24

IMC®: TABLE 1103.1

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL [d]	(F) DEGREES OF HAZARD[a]
				RCL			LFL[f]				
				lb/~~MCf~~ 1000 ft^3	ppm	g/m^3	lb/~~MCf~~ 1000 ft^3	ppm	g/m^3	ppm	
R-11[c]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	6.1	—	—	—	1,000	2-0-0[b]
R-12[c]	CCl_2F_2	dichlorodifluoromethane	A1	5.6	18,000	90	—	—	—	1,000	2-0-0[b]
R-13[c]	$CClF_3$	chlorotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13B1[c]	$CBrF_3$	bromotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13I1	CF_3I	trifluoroiodomethane	A1	1.0	2,000	16	—	—	—	500	—
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400	—	—	—	1,000	2-0-0[b]
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210	—	—	—	1,000	2-0-0[b]
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120	—	—	—	1,000	2-0-0[b]
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—	—	—	—	—	—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—	—	—	—	—	—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2L	4.8	36,000	77	19.1	144,000	306	1,000	1-4-0
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—	—	—	—	—	—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—	—	—	—	—	—
R-50	CH_4	methane	A3	—	—	—	—	50,000	—	1,000	—
R-113[c]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20	—	—	—	1,000	2-0-0[b]
R-114[c]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140	—	—	—	1,000	2-0-0[b]
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760	—	—	—	1,000	—
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550	—	—	—	1,000	1-0-0
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57	—	—	—	50	2-0-0[b]
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56	—	—	—	1,000	2-0-0[b]
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370	—	—	—	1,000	2-0-0[b]
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210	—	—	—	1,000	2-0-0[b]
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500	2-1-0
R-142b	CH_3CClF_2	1-chloro-1, 1-difluoroethane	A2	5.1	20,000	82	20.4	80,000	329	1,000	2-4-0
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2L	4.4	21,000	70	17.5	82,000	282	1,000	2-0-0[b]
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000	1-4-0
R-170	CH_3CH_3	ethane	A3	0.54	7,000	8.6	2.4	31,000	38	1,000	2-4-0
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000	—
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690	—	—	—	1,000	2-0-0[b]
R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580	—	—	—	1,000	—
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340	—	—	—	1,000	2-0-0[b]
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190	—	—	—	300	2-0-0[b]
R-290	$CH_3CH_2CH_3$	propane	A3	0.59	5,300	9.5	2.4	21,000	38	1,000	2-4-0
R-C318	$-(CF_2)_4-$	octafluorocyclobutane	A1	41	80,000	650	—	—	—	1,000	—
R-400[c]	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160	—	—	—	1,000	2-0-0[b]
R-400[c]	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170	—	—	—	1,000	—
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110	—	—	—	1,000	2-0-0[b]
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120	—	—	—	1,000	2-0-0[b]
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84	—	—	—	1,000	2-0-0[b]
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270	—	—	—	1,000	2-0-0[b]
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240	—	—	—	1,000	2-0-0[b]
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120	—	—	—	1,000	2-0-0[b]
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	68,000	290	—	—	—	1,000	2-0-0[b]
R-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500	—	—	—	1,000	2-0-0[b]
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260	—	—	—	1,000	—
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	75	18.8[g]	82,000[g]	301.9[g]	1,000	—
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300	—	—	—	1,000	2-0-0[b]
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330	—	—	—	1,000	2-0-0[b]

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL	(F) DEGREES OF HAZARD
				RCL			LFL				
				~~lb/MCf~~ 1000 ft	ppm	g/m	~~lb/MCf~~ 1000 ft	ppm	g/m	ppm	
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290	—	—	—	1,000	2-0-0[b]
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250	—	—	—	1,000	2-0-0[b]
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280	—	—	—	1,000	2-0-0[b]
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320	—	—	—	1,000	—
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210	—	—	—	1,000	—
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300	—	—	—	1,000	—
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250	—	—	—	1,000	—
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	94,000	330	—	—	—	1,000	2-0-0[b]
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110	—	—	—	1,000	2-0-0[b]
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120	—	—	—	1,000	2-0-0[b]
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420	—	—	—	1,000	2-0-0[b]
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430	—	—	—	1,000	2-0-0[b]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6[f]	55,000[f]	185.6[f]	970	—
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8[f]	70,000[f]	238.3[f]	940	—
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5[f]	87,000[f]	328.6[f]	1,000	—
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	93	23.4[f]	88,000[f]	374.9[f]	1,000	—
R-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100	—	—	—	1,000	—
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	96	—	—	—	1,000	—
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7[g]	56,000[g]	187.9[g]	1,000	—
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	—	—	—	1,000	—
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62	—	—	—	1,000	2-0-0[b]
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	55	—	—	—	1,000	2-0-0[b]
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	69	—	—	—	1,000	—
R-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87	—	—	—	1,000	—
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2[g]	89,000[g]	308.4[g]	1,000	—
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7[g]	60,000[g]	268.6[g]	1,000	—
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5[g]	69,000[g]	297.3[g]	1,000	—
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	44,000	180	—	—	—	1,000	2-0-0[b]
R-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280	—	—	—	1,000	2-0-0[b]
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330	—	—	—	1,000	2-0-0[b]
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290	—	—	—	1,000	2-0-0[b]
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250	—	—	—	1,000	2-0-0[b]
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290	—	—	—	1,000	2-0-0[b]
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260	—	—	—	1,000	2-0-0[b]
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260	—	—	—	1,000	—
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	300	—	—	—	1,000	2-0-0[b]
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100	—	—	—	990	2-0-0[b]
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260	—	—	—	1,000	2-0-0[b]
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83	—	—	—	990	—
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290	—	—	—	1,000	2-1-0
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	84,000	370	—	—	—	1,000	—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000	—
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000	—
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	0.68	5,500	11	2.7	22,000	38.6	1,000	—
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	550	—
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	750	—
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	0.39	3,500	6.3	2.0	18,000	32.1	950	—
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	3,700	6.5	2.0	18,000	83.8	790	—
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320	—	—	—	1,000	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000	—
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	2.0	16,000	32.3	1,000	—
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	8.2	2.0	16,000	32.7	1,000	—
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000	—
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	5.1	19,000	82	—	—	—	990	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79	—	—	990	—	
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	1,000	—
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8[h]	46,000[h]	124.7[h]	1,000	—
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	2.0	16,000	31.7	1,000	—
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330	—	—	1,000	—	
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	640	—
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	~~5.1~~5.0	21,000	~~81~~80	19.9	82,000	~~324.8~~ 319.4	850	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL	(F) DEGREES OF HAZARD
				RCL			LFL				
				~~lb/MCf~~ 1000 ft	ppm	g/m	~~lb/MCf~~ 1000 ft	ppm	g/m	ppm	
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	4.3	23,000	~~69~~70	17.3	93,000	~~277.3~~ 278.1	930	—
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L	~~4.2~~5.4	16,000	~~67~~87	~~2.7~~21.6	63,000	347.4	930	—
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	~~2.5~~3.7	~~16,000~~ 23,000	~~39~~59	~~13.5~~14.8	~~62,000~~ 93,000	~~217.4~~ 237.7	960	—
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	~~2.6~~5.2	~~16,000~~ 32,000	~~42~~83	~~18.9~~20.6	~~65,000~~ 128,000	~~303.5~~ 331.4	960	—
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	~~2.6~~4.8	~~16,000~~ 30,000	~~42~~78	~~20.6~~19.5	121,000	312.7	970	—
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390	—	—	860	—	
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370	—	—	—	840	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370	—	—	—	850	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360	—	—	800	—	
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320	—	—	—	880	—
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	~~5.8~~5.3	18,000	81	~~20.3~~21.3	~~70,000~~ 74,000	~~326.6~~ 341	530	—
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	5.0	18,000	81	~~20.3~~21.3	~~70,000~~ 74,000	~~326.6~~ 341.6	530	—
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	100,000	440	—	—	790	—	
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L	4.8	30,000	77	19.3	119,000	310.5	870	—
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430	—	—	—	810	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120	—	—	1,000	—	
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	~~3.2~~4.4	~~16,000~~ 21,000	~~52~~70	~~18.3~~17.5	~~63,000~~ 84,000	~~293.9~~ 281.4	690	—
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	~~3.1~~4.6	~~19,000~~ 29,000	~~49~~74	~~22.0~~18.5	~~77,000~~ 115,000	~~352.6~~ 296.8	850	—
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	~~4.4~~4.6	19,000	~~71~~73	~~18,0~~18.2	~~62,000~~ 77,000	~~289.5~~ 291.7	620	—
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	~~4.9~~6.8	~~22,000~~ 30,000	~~79~~ 108	26.9	118,000	432.1	650	—
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320	—	—	—	900	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L	3.4	15,000	54	13.5	60,000	216.3	650	—
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730	—
R-457C	zeotrope	R-32/1234yf/152a (7.5/78.0/14.5)	A2L	3.4	13,800	54	13.6	55,000	215	610	
R-457D	zeotrope	R-32/1234yf/152a (4.0/82.0/14.0)	A2L	3.6	14,000	58	14.9	57,000	235	580	
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280	—	—	1,000	—	
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L	4.3	27,000	69	17.4	107,000	278.7	870	—
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L	~~3.6~~5.8	25,000	92	23.3	99,000	373.5	640	—
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380	—	—	—	950	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400	—	—	—	950	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310	—	—	—	900	—
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270	—	—	—	1,000	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	16.6[f]	105,000[f]	265.8[f]	1,000	—
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300	—	—	—	990	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430	—	—	—	930	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL	(F) DEGREES OF HAZARD
				RCL			LFL				
				~~lb/MCf~~ 1000 ft	ppm	g/m	~~lb/MCf~~ 1000 ft	ppm	g/m	ppm	
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660	—
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	6.2	30,000	99	—	—	860	—	
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110	—	—	1,000	—	
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	18,000	66	—	—	—	610	—
R-468B	zeotrope	R-1132a/32/1234yf (6.0/13.0/81.0)	A2L	4.4	18,000	70	570				
R-468C	zeotrope	R-1132a/32/1234yf (6.0/42.0/52.0)	A2L	4.3	23,000	69	710				
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	8	53,000	—	—	—	1,600	—	
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77,000	270	—	—	—	1,100	—
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	16	72,000	270	—	—	—	1,100	—
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160	—	—	710	—	
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72	—	—	—	2,700	—
R-472B	zeotrope	R-744/32/134a (58.0/10.0/32.0)	A1	5.0	36,000	80	2,400				
R-473A	zeotrope	R-1132a/23/744/125 (20.0/10.0/60.0/10.0)	A1	4.8	36,000	77	1,700				
R-474A	zeotrope	R-1132(E)/1234yf (23.0/77.0)	A2L	3.3	13,000	53	13	53,000	209	440	
R-475A	zeotrope	R-1234yf/134a/1234ze(E) (45.0/43.0/12.0)	A1	20.0	73,000	320	690				
R-476A	zeotrope	R-134a/1234ze(E)/1336mzz(E) (10.0/78.0/12.0)	A1	11	38,000	180	750				
R-477A	zeotrope	R-1270/600a (84.0/16.0)	A3	0.13	1,100	2.0	2.4	21,000	38	530	
R-477B	zeotrope	R-1270/600a (38.0/62.0)	A3	0.27	2,100	4.3	2.3	18,000	37	690	
R-478A	zeotrope	R-744/32/125/134a/152a/1234ze(E)/227ea (7.0/26.0/15.0/15.0/3.0/30.0/4.0)	A2L	4.8	24,000	77	17.1[f]	95,000[f]	270[f]	1,100	
R-479A	zeotrope	R-1132(E)/32/1234yf (28.0/21.5/50.5)	A2L	3.0	15,000	48	12.0	61,000	193	510	
R-480A	zeotrope	R-744/1234ze(E)/227ea (5.0/86.0/9.0)	A1	16	59,000	260	900				
R-481A	zeotrope	R-32/125/134a/1233zd(E)/601a (16.9/6.3/74.4/1.8/0.6)	A1	10	45,000	160	1,000				
R-482A	zeotrope	R-134a/1234ze(E)/1224yd(Z) (10.0/83.5/6.5)	A1	18	62,000	290	830				
R-484A	zeotrope	R-1270/600 (12.0/88.0)	A3	0.14	1,000	2.3	2.6	18,000	41	860	
R-500[dc]	azeotrope	R-12/152a (73.8/26.2)	A1	7.4	29,000	120	—	—	—	1,000	2-0-0[b]
R-501[c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210	—	—	—	1,000	—
R-502[dc]	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330	—	—	—	1,000	2-0-0[b]
R-503[dc]	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—	—	—	—	1,000	2-0-0[b]
R-504[c]	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450	—	—	—	1,000	—
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	510	—	—	—	1,000	2-0-0[b]
R-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220	—	—	—	1,000	2-0-0[b]
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200	—	—	—	1,000	2-0-0[b]
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	380	—	—	—	1,000	2-0-0[b]
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000	—
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000	—
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000	—
R-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320	—	—	—	650	—
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330	—	—	—	640	—
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	14	—	—	—	320	—
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	63,000	300	—	—	—	810	—
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290	—	—	810		
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	3.2	13,000	52	13.1	50,000	210.1	590	—
R-600	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000	1-4-0
R-600a	$CH(CH_3)_2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	9.5	2.4	16,000	38	1,000	2-4-0
R-601	$CH_3CH_2CH_2$ CH_2CH_3	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600	—
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600	—
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—	—	—	—	400	—
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—	—	—	—	100	—
R-717	NH_3	ammonia	B2L	0.014	320	0.22	7.2	167,000	116	25	3-3-0[c]
R-718	H_2O	water	A1	—	—	—	—	—	—	—	0-0-0
R-744	CO_2	carbon dioxide	A1	~~4.5~~3.4	~~40,000~~ 30,000	~~72~~54	—	—	—	5,000	2-0-0[b]
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	B2	0.25	1,000	4	16	65,000	258	200	—
R-1132a	$CF_2=CH_2$	1,1-difluoro~~ethylene~~ethene	A2	2.0	13,000	33	8.1	50,000	131	500	—
R-1132(E)	(E)-CFH=CFH	Trans-1,2-difluoroethene	B2	1.8	11,000	28	7.0	43,000	113	350	
R-1150	$CH_2=CH_2$	ethene (ethylene)	~~A3~~B3	—	—	—	2.2	31,000	36	200	1-4-2
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	370	—	—	—	1,000	—
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85	—	—	—	800	—
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2L	4.5	16,000	75	18.0	62,000	289	500	—
R-1234ze(E)	$CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1 -propene	A2L	4.7	16,000	76	18.8	65,000	303	800	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL	(F) DEGREES OF HAZARD
				RCL			LFL				
				~~lb/MCf~~ 1000 ft	ppm	g/m	~~lb/MCf~~ 1000 ft	ppm	g/m	ppm	
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.11	1,000	1.7	—	—	—	500	1-4-1
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2- butene	A1	3.0	7,200	48	—	—	—	400	
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	5.2	13,000	84	—	—	—	500	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3.

a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.

b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.

c. Class I ozone depleting substance; prohibited for new installations.

d. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighed average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

e. LFL is based on WCF @ 73.4°F (23°C) unless otherwise noted.

f. WCFF LFL @ 140°F (60°C).

g. WCFF LFL @ 73.4°F (23°C).

h. WCF LFL @ 212°F (100°C).

Reason: The Refrigerant Classifications (except Degrees of Hazard) are determined by ASHRAE SSPC 34 and published in ASHRAE Standard 34. This proposal seeks to update the refrigerant table with the new refrigerants added to Standard 34 since the last code cycle. The reasons for the additions of new refrigerants can be found at https://www.ashrae.org/standards-research--technology/standards-addenda. All proposed changes are either incorporated into ASHRAE Standard 34-2022 or the published addenda to ASHRAE Standard 34-2022 located at the link above.

Bibliography: ASHRAE Standard 34-2022, Addenda a, b, c, d, e, f, g, h, j, k, m, ac, ah to ASHRAE Standard 34-2022 - https://www.ashrae.org/standards-research--technology/standards-addenda

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Updating the table of refrigerants that could be used in systems does not add labor or material costs because the choice of refrigerant is up to the owner and designer.

M64-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
International Mechanical Code

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD[a]
				RCL			LFL[f]			OEL[d]	
				lb/1000 ft^3	ppm	g/m^3	lb/1000 ft^3	ppm	g/m^3	ppm	
R-11[c]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	6.1	—	—	—	1,000	2-0-0[b]
R-12[c]	CCl_2F_2	dichlorodifluoromethane	A1	5.6	18,000	90	—	—	—	1,000	2-0-0[b]
R-13[c]	$CClF_3$	chlorotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13B1[c]	$CBrF_3$	bromotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13I1	CF_3I	trifluoroiodomethane	A1	1.0	2,000	16	—	—	—	500	—
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400	—	—	—	1,000	2-0-0[b]
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210	—	—	—	1,000	2-0-0[b]
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120	—	—	—	1,000	2-0-0[b]
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—	—	—	—	—	—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—	—	—	—	—	—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2L	4.8	36,000	77	19.1	144,000	306	1,000	1-4-0
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—	—	—	—	—	—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—	—	—	—	—	—
R-50	CH_4	methane	A3	—	—	—	—	50,000	—	1,000	—
R-113[c]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20	—	—	—	1,000	2-0-0[b]
R-114[c]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140	—	—	—	1,000	2-0-0[b]
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760	—	—	—	1,000	—
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550	—	—	—	1,000	1-0-0
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57	—	—	—	50	2-0-0[b]
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56	—	—	—	1,000	2-0-0[b]
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370	—	—	—	1,000	2-0-0[b]
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210	—	—	—	1,000	2-0-0[b]
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500	2-1-0
R-142b	CH_3CClF_2	1-chloro-1, 1-difluoroethane	A2	5.1	20,000	82	20.4	80,000	329	1,000	2-4-0
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2L	4.4	21,000	70	17.5	82,000	282	1,000	2-0-0[b]
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000	1-4-0
R-170	CH_3CH_3	ethane	A3	0.54	7,000	8.6	2.4	31,000	38	1,000	2-4-0
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000	—
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690	—	—	—	1,000	2-0-0[b]
R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580	—	—	—	1,000	—
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340	—	—	—	1,000	2-0-0[b]
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190	—	—	—	300	2-0-0[b]
R-290	$CH_3CH_2CH_3$	propane	A3	0.59	5,300	9.5	2.4	21,000	38	1,000	2-4-0
R-C318	$-(CF_2)_4-$	octafluorocyclobutane	A1	41	80,000	650	—	—	—	1,000	—
R-400[c]	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160	—	—	—	1,000	2-0-0[b]
R-400[c]	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170	—	—	—	1,000	—
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110	—	—	—	1,000	2-0-0[b]
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120	—	—	—	1,000	2-0-0[b]
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84	—	—	—	1,000	2-0-0[b]
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270	—	—	—	1,000	2-0-0[b]
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240	—	—	—	1,000	2-0-0[b]
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120	—	—	—	1,000	2-0-0[b]
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	68,000	290	—	—	—	1,000	2-0-0[b]
R-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500	—	—	—	1,000	2-0-0[b]
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260	—	—	—	1,000	—
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	75	18.8[g]	82,000[g]	301.9[g]	1,000	—
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300	—	—	—	1,000	2-0-0[b]
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330	—	—	—	1,000	2-0-0[b]
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290	—	—	—	1,000	2-0-0[b]
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250	—	—	—	1,000	2-0-0[b]
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280	—	—	—	1,000	2-0-0[b]
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320	—	—	—	1,000	—
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210	—	—	—	1,000	—
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300	—	—	—	1,000	—
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250	—	—	—	1,000	—
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	94,000	330	—	—	—	1,000	2-0-0[b]
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110	—	—	—	1,000	2-0-0[b]
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120	—	—	—	1,000	2-0-0[b]
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420	—	—	—	1,000	2-0-0[b]
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430	—	—	—	1,000	2-0-0[b]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6[f]	55,000[f]	185.6[f]	970	—
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8[f]	70,000[f]	238.3[f]	940	—
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5[f]	87,000[f]	328.6[f]	1,000	—
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	93	23.4[f]	88,000[f]	374.9[f]	1,000	—
R-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100	—	—	—	1,000	—
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	96	—	—	—	1,000	—
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7[g]	56,000[g]	187.9[g]	1,000	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	—	—	—	1,000	—
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62	—	—	—	1,000	2-0-0[b]
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	55	—	—	—	1,000	2-0-0[b]
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	69	—	—	—	1,000	—
R-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87	—	—	—	1,000	—
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2[g]	89,000[g]	308.4[g]	1,000	—
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7[g]	60,000[g]	268.6[g]	1,000	—
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5[g]	69,000[g]	297.3[g]	1,000	—
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	44,000	180	—	—	—	1,000	2-0-0[b]
R-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280	—	—	—	1,000	2-0-0[b]
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330	—	—	—	1,000	2-0-0[b]
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290	—	—	—	1,000	2-0-0[b]
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250	—	—	—	1,000	2-0-0[b]
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290	—	—	—	1,000	2-0-0[b]
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260	—	—	—	1,000	2-0-0[b]
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260	—	—	—	1,000	—
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	300	—	—	—	1,000	2-0-0[b]
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100	—	—	—	990	2-0-0[b]
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260	—	—	—	1,000	2-0-0[b]
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83	—	—	—	990	—
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290	—	—	—	1,000	2-1-0
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	84,000	370	—	—	—	1,000	—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000	—
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000	—
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	0.68	5,500	11	2.7	22,000	38.6	1,000	—
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	550	—
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	750	—
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	0.39	3,500	6.3	2.0	18,000	32.1	950	—
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	3,700	6.5	2.0	18,000	83.8	790	—
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320	—	—	—	1,000	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000	—
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	2.0	16,000	32.3	1,000	—
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	8.2	2.0	16,000	32.7	1,000	—
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000	—
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	5.1	19,000	82	—	—	—	990	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79	—	—	~~990~~	990	
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	1,000	—
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8[h]	46,000[h]	124.7[h]	1,000	—
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	2.0	16,000	31.7	1,000	—
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330	—	—	1,000	—	
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	640	—
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	5.0	21,000	80	19.9	82,000	319.4	850	—
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	4.3	23,000	70	17.3	93,000	278.1	930	—
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L	5.4	16,000	87	21.6	63,000	347.4	930	—
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	3.7	23,000	59	14.8	93,000	237.7	960	—
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	5.2	32,000	83	20.6	128,000	331.4	960	—
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	4.8	30,000	78	19.5	121,000	312.7	970	—
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390	—	—	~~860~~	860	
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370	—	—	—	840	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370	—	—	—	850	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360	—	—	~~880~~	800	
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320	—	—	—	880	—
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	5.3	18,000	81	21.3	74,000	341	530	—
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	5.0	18,000	81	21.3	74,000	341.6	530	—
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	100,000	440	—	—	~~790~~	790	
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L	4.8	30,000	77	19.3	119,000	310.5	870	—
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430	—	—	—	810	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120	—	—	~~1,000~~	1,000	

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	4.4	21,000	70	17.5	84,000	281.4	690	—
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	4.6	29,000	74	18.5	115,000	296.8	850	—
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	4.6	19,000	73	18.2	77,000	291.7	620	—
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	6.8	30,000	108	26.9	118,000	432.1	650	—
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320	—	—	—	900	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L	3.4	15,000	54	13.5	60,000	216.3	650	—
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730	—
R-457C	zeotrope	R-32/1234yf/152a (7.5/78.0/14.5)	A2L	3.4	13,800	54	13.6	55,000	215	610	
R-457D	zeotrope	R-32/1234yf/152a (4.0/82.0/14.0)	A2L	3.6	14,000	58	14.9	57,000	235	580	
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280	—	—	~~1,000~~	1,000	
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L	4.3	27,000	69	17.4	107,000	278.7	870	—
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L	5.8	25,000	92	23.3	99,000	373.5	640	—
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380	—	—	—	950	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400	—	—	—	950	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310	—	—	—	900	—
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270	—	—	—	1,000	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	16.6[f]	105,000[f]	265.8[f]	1,000	—
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300	—	—	—	990	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430	—	—	—	930	—
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660	—
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	6.2	30,000	99	—	—	~~860~~	860	
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110	—	—	~~1,000~~	1,000	
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	18,000	66	—	—	—	610	—
R-468B	zeotrope	R-1132a/32/1234yf (6.0/13.0/81.0)	A2L	4.4	18,000	70	~~570~~			570	
R-468C	zeotrope	R-1132a/32/1234yf (6.0/42.0/52.0)	A2L	4.3	23,000	69	~~710~~			710	
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	8	53,000	—	—	—	~~1,600~~	1,600	
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77,000	270	—	—	—	1,100	—
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	16	72,000	270	—	—	—	1,100	—
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160	—	—	~~710~~	710	
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72	—	—	—	2,700	—
R-472B	zeotrope	R-744/32/134a (58.0/10.0/32.0)	A1	5.0	36,000	80	~~2,400~~			2400	
R-473A	zeotrope	R-1132a/23/744/125 (20.0/10.0/60.0/10.0)	A1	4.8	36,000	77	~~1,700~~			1700	
R-474A	zeotrope	R-1132(E)/1234yf (23.0/77.0)	A2L	3.3	13,000	53	13	53,000	209	440	
R-475A	zeotrope	R-1234yf/134a/1234ze(E) (45.0/43.0/12.0)	A1	20.0	73,000	320	~~690~~			690	
R-476A	zeotrope	R-134a/1234ze(E)/1336mzz(E) (10.0/78.0/12.0)	A1	11	38,000	180	~~750~~			750	
R-477A	zeotrope	R-1270/600a (84.0/16.0)	A3	0.13	1,100	2.0	2.4	21,000	38	530	
R-477B	zeotrope	R-1270/600a (38.0/62.0)	A3	0.27	2,100	4.3	2.3	18,000	37	690	
R-478A	zeotrope	R-744/32/125/134a/152a/1234ze(E)/227ea (7.0/26.0/15.0/15.0/3.0/30.0/4.0)	A2L	4.8	24,000	77	17.1[f]	95,000[f]	270[f]	1,100	
R-479A	zeotrope	R-1132(E)/32/1234yf (28.0/21.5/50.5)	A2L	3.0	15,000	48	12.0	61,000	193	510	
R-480A	zeotrope	R-744/1234ze(E)/227ea (5.0/86.0/9.0)	A1	16	59,000	260	~~900~~			900	
R-481A	zeotrope	R-32/125/134a/1233zd(E)/601a (16.9/6.3/74.4/1.8/0.6)	A1	10	45,000	160	~~1,000~~			1,000	
R-482A	zeotrope	R-134a/1234ze(E)/1224yd(Z) (10.0/83.5/6.5)	A1	18	62,000	290	~~830~~			830	
R-484A	zeotrope	R-1270/600 (12.0/88.0)	A3	0.14	1,000	2.3	2.6	18,000	41	860	
R-500[c]	azeotrope	R-12/152a (73.8/26.2)	A1	7.4	29,000	120	—	—	—	1,000	2-0-0[b]
R-501[c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210	—	—	—	1,000	—
R-502[c]	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330	—	—	—	1,000	2-0-0[b]
R-503[c]	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—	—	—	—	1,000	2-0-0[b]
R-504[c]	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450	—	—	—	1,000	—
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	510	—	—	—	1,000	2-0-0[b]
R-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220	—	—	—	1,000	2-0-0[b]
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200	—	—	—	1,000	2-0-0[b]
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	380	—	—	—	1,000	2-0-0[b]
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000	—
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000	—
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000	—
R-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320	—	—	—	650	—
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330	—	—	—	640	—
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	14	—	—	—	320	—
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	63,000	300	—	—	—	810	—
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290	—	—	~~810~~	810	
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	3.2	13,000	5 2	13.1	50,000	210.1	590	—

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-600	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000	1-4-0
R-600a	$CH(CH_3)_2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	9.5	2.4	16,000	38	1,000	2-4-0
R-601	$CH_3CH_2CH_2CH_2CH_3$	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600	—
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600	—
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—	—	—	—	400	—
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—	—	—	—	100	—
~~R-717~~	~~NH_3~~	~~ammonia~~	~~B2L~~	~~0.014~~	~~320~~	~~0.22~~	~~7.2~~	~~167,000~~	~~116~~	~~25~~	~~3-3-0~~[e]
R-718	H_2O	water	A1	—	—	—	—	—	—	—	0-0-0
R-744	CO_2	carbon dioxide	A1	3.4	30,000	54	—	—	—	5,000	2-0-0[b]
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	B2	0.25	1,000	4	16	65,000	258	200	—
R-1132a	$CF_2=CH_2$	1,1-difluoroethene	A2	2.0	13,000	33	8.1	50,000	131	500	—
R-1132(E)	(E)-CFH=CFH	Trans-1,2-difluoroethene	B2	1.8	11,000	28	7.0	43,000	113	350	
R-1150	$CH_2=CH_2$	ethene (ethylene)	B3	—	—	—	2.2	31,000	36	200	1-4-2
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	370	—	—	—	1,000	—
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85	—	—	—	800	—
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2L	4.5	16,000	75	18.0	62,000	289	500	—
R-1234ze(E)	$CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1 -propene	A2L	4.7	16,000	76	18.8	65,000	303	800	—
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.11	1,000	1.7	—	—	—	500	1-4-1
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2- butene	A1	3.0	7,200	48	—	—	—	400	
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	5.2	13,000	84	—	—	—	500	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3.

a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.

b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.

c. Class I ozone depleting substance; prohibited for new installations.

d. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighed average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

e. LFL is based on WCF @ 73.4°F (23°C) unless otherwise noted.

f. WCFF LFL @ 140°F (60°C).

g. WCFF LFL @ 73.4°F (23°C).

h. WCF LFL @ 212°F (100°C).

FLOOR MODIFICATION # 3958

Committee Reason:
The committee approved the proposal with modifications by a vote of 14-0. The refrigerant classifications are established by ASHRAE SSPC 34 and published in ASHRAE Standard 34. With the addition of additional refrigerants to Standard 34 during the last code cycle, this proposal aims to update the refrigerant table. See https://www.ashrae.org/standards-research-technology/standards-addenda for the rationale behind the incorporation of new refrigerants. The published addenda to ASHRAE Standard 34-2022, accessed via the URL above, incorporates revisions.

M64-24

Individual Consideration Agenda

Comment 1:

IMC®: TABLE 1103.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Mechanical Code

Revise as follows:

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD[a]
				RCL			LFL[f]			OEL[d]	
				lb/1000 ft^3	ppm	g/m^3	lb/1000 ft^3	ppm	g/m^3	ppm	
R-11[c]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	6.1	—	—	—	1,000	2-0-0[b]
R-12[c]	CCl_2F_2	dichlorodifluoromethane	A1	5.6	18,000	90	—	—	—	1,000	2-0-0[b]
R-13[c]	$CClF_3$	chlorotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13B1[c]	$CBrF_3$	bromotrifluoromethane	A1	—	—	—	—	—	—	1,000	2-0-0[b]
R-13I1	CF_3I	trifluoroiodomethane	A1	1.0	2,000	16	—	—	—	500	—
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400	—	—	—	1,000	2-0-0[b]
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210	—	—	—	1,000	2-0-0[b]
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120	—	—	—	1,000	2-0-0[b]
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—	—	—	—	—	—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—	—	—	—	—	—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2L	4.8	36,000	77	19.1	144,000	306	1,000	1-4-0
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—	—	—	—	—	—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—	—	—	—	—	—
R-50	CH_4	methane	A3	—	—	—	—	50,000	—	1,000	—
R-113[c]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20	—	—	—	1,000	2-0-0[b]
R-114[c]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140	—	—	—	1,000	2-0-0[b]
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760	—	—	—	1,000	—
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550	—	—	—	1,000	1-0-0
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57	—	—	—	50	2-0-0[b]
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56	—	—	—	1,000	2-0-0[b]
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370	—	—	—	1,000	2-0-0[b]
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210	—	—	—	1,000	2-0-0[b]
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500	2-1-0
R-142b	CH_3CClF_2	1-chloro-1, 1-difluoroethane	A2	5.1	20,000	82	20.4	80,000	329	1,000	2-4-0
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2L	4.4	21,000	70	17.5	82,000	282	1,000	2-0-0[b]
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000	1-4-0
R-170	CH_3CH_3	ethane	A3	0.54	7,000	8.6	2.4	31,000	38	1,000	2-4-0
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000	—
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690	—	—	—	1,000	2-0-0[b]
R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580	—	—	—	1,000	—
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340	—	—	—	1,000	2-0-0[b]
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190	—	—	—	300	2-0-0[b]
R-290	$CH_3CH_2CH_3$	propane	A3	0.59	5,300	9.5	2.4	21,000	38	1,000	2-4-0
R-C318	$-(CF_2)_4-$	octafluorocyclobutane	A1	41	80,000	650	—	—	—	1,000	—
R-400[c]	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160	—	—	—	1,000	2-0-0[b]
R-400[c]	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170	—	—	—	1,000	—
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110	—	—	—	1,000	2-0-0[b]
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120	—	—	—	1,000	2-0-0[b]
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84	—	—	—	1,000	2-0-0[b]
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270	—	—	—	1,000	2-0-0[b]
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240	—	—	—	1,000	2-0-0[b]
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120	—	—	—	1,000	2-0-0[b]
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	68,000	290	—	—	—	1,000	2-0-0[b]
R-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500	—	—	—	1,000	2-0-0[b]
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260	—	—	—	1,000	—
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	75	18.8[g]	82,000[g]	301.9[g]	1,000	—
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300	—	—	—	1,000	2-0-0[b]

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330	—	—	—	1,000	2-0-0[b]
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290	—	—	—	1,000	2-0-0[b]
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250	—	—	—	1,000	2-0-0[b]
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280	—	—	—	1,000	2-0-0[b]
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320	—	—	—	1,000	—
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210	—	—	—	1,000	—
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300	—	—	—	1,000	—
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250	—	—	—	1,000	—
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	94,000	330	—	—	—	1,000	2-0-0[b]
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110	—	—	—	1,000	2-0-0[b]
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120	—	—	—	1,000	2-0-0[b]
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420	—	—	—	1,000	2-0-0[b]
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430	—	—	—	1,000	2-0-0[b]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6[f]	55,000[f]	185.6[f]	970	—
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8[f]	70,000[f]	238.3[f]	940	—
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5[f]	87,000[f]	328.6[f]	1,000	—
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	93	23.4[f]	88,000[f]	374.9[f]	1,000	—
R-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100	—	—	—	1,000	—
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	96	—	—	—	1,000	—
R-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7[g]	56,000[g]	187.9[g]	1,000	—
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	—	—	—	1,000	—
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62	—	—	—	1,000	2-0-0[b]
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	55	—	—	—	1,000	2-0-0[b]
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	69	—	—	—	1,000	—
R-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87	—	—	—	1,000	—
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2[g]	89,000[g]	308.4[g]	1,000	—
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7[g]	60,000[g]	268.6[g]	1,000	—
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5[g]	69,000[g]	297.3[g]	1,000	—
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	44,000	180	—	—	—	1,000	2-0-0[b]
R-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280	—	—	—	1,000	2-0-0[b]
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330	—	—	—	1,000	2-0-0[b]
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290	—	—	—	1,000	2-0-0[b]
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250	—	—	—	1,000	2-0-0[b]
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290	—	—	—	1,000	2-0-0[b]
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260	—	—	—	1,000	2-0-0[b]
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260	—	—	—	1,000	—
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	300	—	—	—	1,000	2-0-0[b]
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100	—	—	—	990	2-0-0[b]
R-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260	—	—	—	1,000	2-0-0[b]
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83	—	—	—	990	—
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290	—	—	—	1,000	2-1-0
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	84,000	370	—	—	—	1,000	—
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000	—
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000	—
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	0.68	5,500	11	2.7	22,000	38.6	1,000	—
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	550	—
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	750	—
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	0.39	3,500	6.3	2.0	18,000	32.1	950	—
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	3,700	6.5	2.0	18,000	83.8	790	—
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320	—	—	—	1,000	—
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000	—
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	2.0	16,000	32.3	1,000	—
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	8.2	2.0	16,000	32.7	1,000	—
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000	—
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	5.1	19,000	82	—	—	—	990	—
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79	—	—		990	
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	1,000	—
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8[h]	46,000[h]	124.7[h]	1,000	—
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	2.0	16,000	31.7	1,000	—
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330	—	—	1,000	—	
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	640	—
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L	5.0	21,000	80	19.9	82,000	319.4	850	—
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L	4.3	23,000	70	17.3	93,000	278.1	930	—

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				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L	5.4	16,000	87	21.6	63,000	347.4	930	—
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L	3.7	23,000	59	14.8	93,000	237.7	960	—
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L	5.2	32,000	83	20.6	128,000	331.4	960	—
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L	4.8	30,000	78	19.5	121,000	312.7	970	—
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390	—	—		860	
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370	—	—	—	840	—
R-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370	—	—	—	850	—
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360	—	—		800	
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320	—	—	—	880	—
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L	5.3	18,000	81	21.3	74,000	341	530	—
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L	5.0	18,000	81	21.3	74,000	341.6	530	—
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	100,000	440	—	—		790	
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L	4.8	30,000	77	19.3	119,000	310.5	870	—
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430	—	—	—	810	—
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120	—	—		1,000	
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L	4.4	21,000	70	17.5	84,000	281.4	690	—
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L	4.6	29,000	74	18.5	115,000	296.8	850	—
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L	4.6	19,000	73	18.2	77,000	291.7	620	—
R-454D	zeotrope	R-32/1234yf (43.0/57.0)	A2L	4.4	22,000	69	17.4	87,500	275	730	
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L	6.8	30,000	108	26.9	118,000	432.1	650	—
R-455B	zeotrope	R-744/32/1234yf (6.0/42.0/52.0)	A2L	5.2	28,000	81	20.6	110,000	324	800	
R-455C	zeotrope	R-744/32/1234yf (3.0/43.0/54.0)	A2L	4.8	25,000	76	19.3	100,000	305	770	
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320	—	—	—	900	—
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L	3.4	15,000	54	13.5	60,000	216.3	650	—
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730	—
R-457C	zeotrope	R-32/1234yf/152a (7.5/78.0/14.5)	A2L	3.4	13,800	54	13.6	55,000	215	610	
R-457D	zeotrope	R-32/1234yf/152a (4.0/82.0/14.0)	A2L	3.6	14,000	58	14.9	57,000	235	580	
R-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280	—	—		1,000	
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L	4.3	27,000	69	17.4	107,000	278.7	870	—
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L	5.8	25,000	92	23.3	99,000	373.5	640	—
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380	—	—	—	950	—
R-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400	—	—	—	950	—
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310	—	—	—	900	—
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270	—	—	—	1,000	—
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	16.6[f]	105,000[f]	265.8[f]	1,000	—
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300	—	—	—	990	—
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430	—	—	—	930	—
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660	—
R-466A	zeotrope	R-32/125/13I1 (49.0/11.5/39.5)	A1	6.2	30,000	99	—	—		860	
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110	—	—		1,000	
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	18,000	66	—	—	—	610	—
R-468B	zeotrope	R-1132a/32/1234yf (6.0/13.0/81.0)	A2L	4.4	18,000	70				570	
R-468C	zeotrope	R-1132a/32/1234yf (6.0/42.0/52.0)	A2L	4.3	23,000	69				710	
R-469A	zeotrope	R-744/R-32/R-125 (35.0/32.5/32.5)	A1	8	53,000	—	—	—		1,600	

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE							(F) DEGREES OF HAZARD
				RCL			LFL			OEL	
				lb/1000 ft	ppm	g/m	lb/1000 ft	ppm	g/m	ppm	
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77,000	270	—	—	—	1,100	—
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	16	72,000	270	—	—	—	1,100	—
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160	—	—		710	
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72	—	—	—	2,700	—
R-472B	zeotrope	R-744/32/134a (58.0/10.0/32.0)	A1	5.0	36,000	80				2,400	
R-473A	zeotrope	R-1132a/23/744/125 (20.0/10.0/60.0/10.0)	A1	4.8	36,000	77				1,700	
R-474A	zeotrope	R-1132(E)/1234yf (23.0/77.0)	A2L	3.3	13,000	53	13	53,000	209	440	
R-474B	zeotrope	R-1132(E)/1234yf (31.5/68.5)	A2L	3.0	13,000	47	12.0	51,000	189	420	
R-475A	zeotrope	R-1234yf/134a/1234ze(E) (45.0/43.0/12.0)	A1	20.0	73,000	320				690	
R-476A	zeotrope	R-134a/1234ze(E)/1336mzz(E) (10.0/78.0/12.0)	A1	11	38,000	180				750	
R-477A	zeotrope	R-1270/600a (84.0/16.0)	A3	0.13	1,100	2.0	2.4	21,000	38	530	
R-477B	zeotrope	R-1270/600a (38.0/62.0)	A3	0.27	2,100	4.3	2.3	18,000	37	690	
R-478A	zeotrope	R-744/32/125/134a/152a/1234ze(E)/227ea (7.0/26.0/15.0/15.0/3.0/30.0/4.0)	A2L	4.8	24,000	77	17.1[f]	95,000[f]	270[f]	1,100	
R-479A	zeotrope	R-1132(E)/32/1234yf (28.0/21.5/50.5)	A2L	3.0	15,000	48	12.0	61,000	193	510	
R-480A	zeotrope	R-744/1234ze(E)/227ea (5.0/86.0/9.0)	A1	16	59,000	260				900	
R-481A	zeotrope	R-32/125/134a/1233zd(E)/601a (16.9/6.3/74.4/1.8/0.6)	A1	10	45,000	160				1,000	
R-482A	zeotrope	R-134a/1234ze(E)/1224yd(Z) (10.0/83.5/6.5)	A1	18	62,000	290				830	
R-483A	zeotrope	R-290/600 (15.0/85.0)	A3	0.17	1,200	2.8	2.6	18,000	41	1,000	
R-484A	zeotrope	R-1270/600 (12.0/88.0)	A3	0.14	1,000	2.3	2.6	18,000	41	860	
R-486A	zeotrope	R-1234yf/134a/13I1/1234ze(E)(21.9/6.3/38.0/33.8)	A1	2.5	7,300	40				620	
R-487A	zeotrope	R-170/1270 (20.0/80.0)	A3	0.13	1,300	2.1	2.2	22,000	35	570	
R-488A	zeotrope	R-32/1234yf/152a/1234ze(E) (6.0/50.0/3.0/41.0)	A2L	4.3	16,000	68	17.1	63,000	270	650	
R-489A	zeotrope	R-50/1150/600 (1.5/22.0/76.5)	A3	0.12	1,000	1.9	2.4	20,000	38	410	
R-490A	zeotrope	R-1150/1270 (7.9/92.1)	A3	0.1	1,000	1.7	2.4	22,000	37	430	
R-491A	zeotrope	R-1132(E)/152a (35.0/65.0)	A2	2.0	12,000	30.8	7.8	46,000	123	600	
R-500[c]	azeotrope	R-12/152a (73.8/26.2)	A1	7.4	29,000	120	—	—	—	1,000	2-0-0[b]
R-501[c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210	—	—	—	1,000	—
R-502[c]	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330	—	—	—	1,000	2-0-0[b]
R-503[c]	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—	—	—	—	1,000	2-0-0[b]
R-504[c]	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450	—	—	—	1,000	—
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	510	—	—	—	1,000	2-0-0[b]
R-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220	—	—	—	1,000	2-0-0[b]
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200	—	—	—	1,000	2-0-0[b]
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	380	—	—	—	1,000	2-0-0[b]
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000	—
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000	—
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000	—
R-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320	—	—	—	650	—
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330	—	—	—	640	—
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	14	—	—	—	320	—
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	63,000	300	—	—	—	810	—
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290	—	—		810	
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	3.2	13,000	5 2	13.1	50,000	210.1	590	—
R-600	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000	1-4-0
R-600a	$CH(CH_3)_2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	9.5	2.4	16,000	38	1,000	2-4-0
R-601	$CH_3CH_2CH_2CH_2CH_3$	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600	—
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600	—
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—	—	—	—	400	—
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—	—	—	—	100	—
R-718	H_2O	water	A1	—	—	—	—	—	—	—	0-0-0
R-744	CO_2	carbon dioxide	A1	3.4	30,000	54	—	—	—	5,000	2-0-0[b]
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	B2	0.25	1,000	4	16	65,000	258	200	—
R-1132a	$CF_2=CH_2$	1,1-difluoroethene	A2	2.0	13,000	33	8.1	50,000	131	500	—
R-1132(E)	(E)-CFH=CFH	Trans-1,2-difluoroethene	B2	1.8	11,000	28	7.0	43,000	113	350	
R-1150	$CH_2=CH_2$	ethene (ethylene)	B3	—	—	—	2.2	31,000	36	200	1-4-2
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	370	—	—	—	1,000	—
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85	—	—	—	800	—
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2L	4.5	16,000	75	18.0	62,000	289	500	—
R-1234ze(E)	$CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1 -propene	A2L	4.7	16,000	76	18.8	65,000	303	800	—
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.11	1,000	1.7	—	—	—	500	1-4-1
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2- butene	A1	3.0	7,200	48	—	—	—	400	

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE								(F) DEGREES OF HAZARD
				RCL				LFL			OEL	
				lb/1000 ft	ppm	g/m		lb/1000 ft	ppm	g/m	ppm	
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	5.2	13,000	84		—	—	—	500	—

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283 m^3.

a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.

b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.

c. Class I ozone depleting substance; prohibited for new installations.

d. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighed average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

e. LFL is based on the Worst Case of Formulation for Flammability (WCF) @ 73.4°F (23°C) unless otherwise noted.

f. Worst Case of Fractionation for Flammability (WCFF) LFL @ 140°F (60°C).

g. WCFF LFL @ 73.4°F (23°C).

h. WCF LFL @ 212°F (100°C).

Reason: The additional 11 refrigerants in this update have been approved by ASHRAE's Standard 34 committee and published via addenda, which can be read here: https://www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda
This modification also provides a clarification to a footnote based on feedback from CAH #1. We have now stated the meaning of the acronyms WCF and WCFF.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Making the list of approved refrigerants from ASHRAE 34 available to users of the IMC does not impact cost.

Comment (CAH2)# 300

M65-24

IMC®: 1103.1

Proposed Change as Submitted

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Mechanical Code

Revise as follows:

1103.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1. Refrigerants without a refrigerant number designation or without a safety group classification in the referenced edition of ASHRAE Standard 34 shall be classified in accordance with the criteria in ASHRAE Standard 34 as a single-compound refrigerant blend of two or more compounds. Such safety classifications not assigned by ASHRAE Standard 34 shall be submitted for approval to the code official. Compliance with the requirements of this code is contingent upon use of approved safey classifications where not assigned by the referenced edition of ASHRAE Standard 34.

Reason: This change accounts for the fact that new refrigerants will be approved during continuous maintenance of ASHRAE 34 that cannot all be reflected in the latest edition of the IMC due to timing. It offers flexibility to use approved refrigerants even though they are not yet specified in the IMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will provide more choice to the user and, thus, direct costs could ultimately be lower. In general, this change is not expected to have a bearing on cost.

M65-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of this proposal. The committee's justification is based on the proposed code language's dependence on an authorized safety classification.

M65-24

Individual Consideration Agenda

Comment 1:

IMC®: 1103.1

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org) requests As Modified by Committee (AMC2)

Modify as follows:

1103.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1. Refrigerants without a ~~refrigerant number designation~~*refrigerant designation* or without a refrigerant safety group classification in the referenced edition of ASHRAE Standard 34 shall be classified in accordance with the criteria in ASHRAE Standard 34 as a single-compound refrigerant or a refrigerant blend of two or more compounds. ~~Such safety classifications not assigned by ASHRAE Standard 34 shall be submitted for approval to the code official. Compliance with the requirements of this code is contingent upon use of approved safey classifications where not assigned by the referenced edition of ASHRAE Standard 34.~~ Documentation supporting the proposed classification shall be submitted to the *code official.*

Reason: This language provides the AHJ with instructions on how to use alternative means to approve refrigerants not listed in Table 1103.1 or the referenced edition of ASHRAE Standard 34. Many refrigerants are approved as addenda to the referenced edition of ASHRAE Standard 34 that are not captured in Table 1103.1. Additionally, refrigerants assigned a provisional safety group by ASHRAE Standard 34 might also be considered for field trials.This proposal would also make Section 11 better aligned with ASHRAE Standard 15-2022.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not alter the cost associated with refrigeration systems. It merely provides additional flexibility for refrigerant classification as new options become available between code cycles.

Comment (CAH2)# 207

M69-24

IMC®: TABLE 1107.4, ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1107.4 REFRIGERANT PIPE

PIPING MATERIAL	STANDARD
Aluminum tube	ASTM B210 , ASTM B491/B491M
Brass (copper alloy) pipe	ASTM B43
Copper linesets	ASTM B280, ASTM B1003
Copper pipe	ASTM B42, ASTM B302
Copper tube[a]	ASTM B68 , ASTM B75, ASTM B88, ASTM B280, ASTM B819
Polyethylene of Raised Temperature/ Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT)pipe	ASTM F3506
Steel pipe[b]	ASTM A53, ASTM A106 , ASTM A333
Steel tube	ASTM A254, ASTM A334

a. Soft annealed copper tubing larger than $1\frac{3}{8}$ inch (35 mm) O.D. shall not be used for field-assembled refrigerant piping unless it is protected from mechanical damage.

b. ASTM A53, Type F steel pipe shall only be permitted for discharge lines in pressure relief systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F3506-21e1 Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems

Reason: Piping produced according to ASTM F3506 “Standard Specification for Polyethylene of Raised Temperature/Aluminum/Polyethylene of Raised Temperature (PE-RT/AL/PE-RT) Composite Pressure Pipe based on Inner Diameter (ID) for use in Air Conditioning and Refrigeration Line Set Systems” is intended specifically for the applications referred to in Section 1107.4 of the code and in Table 1107.4. It is proposed to add this piping material to Table 1107.4 to provide installers with a high-performance corrosion-resistant option for this application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Including PE-RT/AL/PE-RT piping produced according to ASTM F3506 in Table 1107.4 provides an alternative piping option for refrigerant applications. PE-RT/AL/PE-RT piping is less expensive than some of the existing materials (e.g., copper, brass, or steel), but may be more expensive than certain other piping materials. This code change proposal may decrease the cost of construction by 0% to 10% if PE-RT/AL/PE-RT piping is selected by users, or it may increase the cost of construction by 0% to 10% if selected, or it may have no impact on the cost of construction if PERT/ AL/PE-RT piping is not selected. It depends on which of the seven existing approved materials is used for this comparison.

To assign dollar values to this proposal, the use of PE-RT/AL/PE-RT piping could decrease construction costs over a range from $1

to $10,000, depending on the size of the project, size of piping, etc. or it could increase construction costs over a range from $1 to $10,000, depending on the size of the project, size of piping, etc., or it could have no effect on construction costs if users do not select to use PERT/AL/PE-RT piping. This proposal simply provides another material option.

Estimated Immediate Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4.. This proposal simply provides another material option. The amount of the cost decrease or increase is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. Therefore, only a range of cost decreases or increases can be provided in this format.

Estimated Life Cycle Cost Impact:

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Seven (7) piping materials produced according to seventeen (17) listed standards are already approved in Table 1107.4. This proposal simply provides another material option. The impact to Life Cycle Cost is highly dependent on exact comparisons for specific piping materials and sizes plus assembly and construction costs which vary for each individual project. PE-RT/AL/PE-RT piping has a corrosion-resistant plastic inner and outer liner for long life.

M69-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 13-1 to disapprove of this proposal. The committee argues that more testing is required for composite pressure pipe items contained in the proposed code language. Additional testing is necessary expressly for the uses mentioned in Table 1107.4 and Section 1107.4 of the code.

M69-24

Individual Consideration Agenda

Comment 1:

Proponents: Brad Campbell, Titeflex Corp Gastite, Titeflex Corp Gastite (brad.campbell@gastite.com) requests As Submitted

Reason: Reconsider M69-24 to add ASTM F3506 to Table 1107.4 because feedback from the IMC TC was heard. At the time of this submission, ASTM F3506 is being revised to include new requirements for UV resistance, flame and smoke resistance, and additional refrigerant exposure testing. A second ASTM F17 project to add crush and impact testing is being developed and is expected to be submitted for ASTM ballot and approval by the end of 2024.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

M85-24

IMC®: TABLE 1210.4, TABLE 1210.5, 1210.6.9

Proposed Change as Submitted

Proponents: Greg Kurtz Technical Director, The International Ground Source Heat Pump Association (IGSHPA), The International Ground Source Heat Pump Association (IGSHPA) (gkurtz@igshpa.org)

2024 International Mechanical Code

Revise as follows:

TABLE 1210.4 GROUND-SOURCE LOOP PIPE

MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F441; ASTM F442
Cross-linked polyethylene (PEX)	ASTM F876; ASTM F3253; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE) pressure pipe	ASTM F1282; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2737; ASTM D3035; ASTM F714; AWWA C901; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
~~Polyvinyl chloride (PVC)~~	~~ASTM D1785; ASTM D2241~~
Raised temperature polyethylene (PE-RT)	ASTM F2623; ASTM F2769; CSA B137.18; CSA C448; NSF 358-4

TABLE 1210.5 GROUND-SOURCE LOOP PIPE FITTINGS

PIPE MATERIAL	STANDARD (see Chapter 15)
Chlorinated polyvinyl chloride (CPVC)	ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Cross-linked polyethylene (PEX)	ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2159; ASTM F2434; ASTM F3347; ASTM F3348; CSA B137.5; CSA C448; NSF 358-3
Polyethylene/aluminum/polyethylene (PE-AL-PE)	ASTM F1282; ASTM F2434; CSA B137.9
High-density polyethylene (HDPE)	ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1; CSA C448; NSF 358-1
Polypropylene (PP-R)	ASTM F2389; CSA B137.11; NSF 358-2
~~Polyvinyl chloride (PVC)~~	~~ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3~~
Raised temperature polyethylene (PE-RT)	ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.1; CSA B137.18; CSA C448; NSF 358-4

Delete without substitution:

~~**1210.6.9 PVC plastic pipe.** Joints between PVC plastic pipe and fittings shall be solvent cemented or threaded joints complying with Section 1203.3.~~

Reason: PVC is a rigid piping material supplied only in short lengths of 10-20 feet and joined via solvent cement or various types of mechanical fittings (e.g., flanges). This pipe is not suitable for ground loop piping because of its lack of flexibility and requirement for many joints over a typical pipe length of 400 or more feet in a ground loop piping system. In addition, the time required for solvent cement joints to cure is not suitable for installation of pipes in a vertical borehole, which often requires more than 400 feet of two vertical pipes to be installed as quickly as possible to prevent the drilled hole from collapsing. The International Ground Source Heat Pump Association (IGSHPA), founded in 1987, has never recommended PVC for ground source loop piping. Failures have occurred in the field when installers attempted to use PVC piping for these applications many years ago. The *ANSI / CSA / IGSHPA C448 Series 16 Bi-National Standard for the design and installation of ground source heat pump systems for commercial and residential buildings* does not list PVC rigid piping as an acceptable material for Geothermal ground loop installations. Additionally, the piping Task Force for the New Edition (2024) of the *ANSI / CSA / IGSHPA C448 Bi- National Standard* have reviewed all suitable piping materials for Geothermal ground loop installations and continue to NOT list PVC material as suitable piping material for Geothermal installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

PVC is one of seven (7) piping materials listed in Table 1210.4 for ground loop piping and the user has several choices of better materials for this application, which are approved by IGSHPA or listed in the ANSI / CSA / IGSHPA Bi – National C448 Standard, and commonly used for this purpose. Because PVC is known in the industry to be not suitable for these applications and is not recommended for this purpose by IGSHPA, or the ANSI / CSA /

IGSHPA Bi – National C448 Standard it is rarely, if ever, used for this purpose. Therefore, the removal of PVC piping from Table 1210.4 will neither decrease nor increase the cost of construction.

M85-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee voted 9-5 to approve this proposal as submitted. The committee's reasoning is that of the proponent's reason statement. Only 10 to 20-foot short lengths are available for PVC, a rigid piping material that can be linked using flanges or other mechanical connections. This pipe's lack of flexibility and the need for several joints over a typical pipe length of 400 feet or more make it unsuitable for ground-loop piping systems. Furthermore, placing pipes in a vertical borehole necessitates the faster installation of more than 400 feet of two vertical pipes to prevent the drilled hole from collapsing. Solvent cement joints take too long to cure. The International Ground Source Heat Pump Association (IGSHPA), established in 1987, has never advised PVC for ground source loop piping. Many years ago, there were field failures when installers tried to use PVC plumbing for similar applications. According to the ANSI, CSA, and IGSHPA C448 Series 16 Bi-National Standard for designing and installing ground source and heat pump systems for commercial and residential buildings, PVC rigid piping is inappropriate for geothermal ground loop installations [12]. Furthermore, after reviewing all acceptable pipe materials for geothermal ground loop installations, the piping task force for the New Edition (2024) of the ANSI, CSA, and IGSHPA C448 Bi-National Standard has decided to keep PVC off the list of acceptable piping materials for geothermal installations.

M85-24

Individual Consideration Agenda

Comment 1:

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com) requests Disapproved

Reason: PVC and CPVC should remain as options. While the majority of the piping in these systems would likely be coils of polyethylene, PEX or PE-RT, rigid pipe could have use in manifolds and other above ground piping.

There is also a lack of a definition of what the "GROUND-SOURCE LOOP PIPE" consists of, is it only the below ground loops themselves, or does it include all piping/valves and fittings associated with the working fluid?

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 329

M87-24

IMC®: TABLE 1302.3

Proposed Change as Submitted

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Mechanical Code

Revise as follows:

TABLE 1302.3 FUEL OIL PIPING AND FITTINGS

MATERIAL	STANDARD (see Chapter 15)
Copper or copper-alloy pipe and fittings	ASTM B42; ASTM B43; ASTM B302; ASTM F3226
Copper or copper-alloy tubing and fittings (Type K, L or M)	~~ASME B16.51;~~ ASTM B75; ASTM B88; ~~ASTM B280;~~ ASTM F3226
Labeled pipe	(See Section 1302.4)
Nonmetallic pipe	ASTM D2996
Steel and stainless steel pipe and fittings	ASTM A53; ASTM A106; A312/A312M; ASTM F3226; UL 180
Steel and stainless steel tubing and fittings	ASTM A254; A269/A269M; ASTM A539; ASTM F3226; UL 180

Reason: This proposal adds UL 180 "Combustible Liquid Tank Accessories" is a standard for pipe, fittings, and accessories for use with fuel oil. This Standard has been revised since the IMC was last updated, and now includes press-connect fittings. Adding UL 180 to this table will allow press-connect fittings to be used for fuel oil applications, and inspectors will be able to verify that those fittings have been listed and labeled for the application.

This proposal will also remove the standards ASME B16.51 "Copper and Copper-Alloy Press-Connect Pressure Fittings" and ASTM B280 "Seamless Copper Tube for Air Conditioning and Refrigeration Field Service." ASME B16.51 has a scope which covers only "...pressure fittings for use with hard-drawn seamless copper water tube conforming to ASTM B88 for piping systems conveying water." ASTM B280 is a refrigerant tubing standard. It is our understanding that these standards were used in lieu of applicable standards available at the time. The Code will be more accurate and less confusing with these two inappropriate references removed from the Table. Removal of these standards from this table will decrease the likelihood of inappropriate products being used in a fuel oil application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this standard does not increase the cost of construction. The addition of this standard allows for a wider selection of materials but does not make their use mandatory. By including this standard in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

M87-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 10-4 to disapprove of the proposal. The committee felt that the proposed code language included the wrong standard suggested for Table 1302.3 by the proponent.

M87-24

Individual Consideration Agenda

Comment 1:

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC (adam@hydrotech-h2o.com) requests As Submitted

Reason: This comment is to urge the committee to accept proposal M87-24 as submitted.

During Committee Action Hearing 1 a concern was raised about the applicability of UL 180 for inclusion in Table 1302.3 due to its title being "Combustible Liquid Tank Accessories." While the title of UL 180 seems to indicate otherwise, UL 180 does in fact include pipe and fittings within the scope of the Standard, as well as construction requirements for piping systems. During its last revision (2023) UL 180 had its scope greatly expanded specifically to cover pipe and fittings used to fill and vent fuel oil storage tanks, as well as pipe and fittings used to connect fuel oil tanks to their oil burning equipment. So while the title says "Tank Accessories" this standard covers significantly more than just accessories.

The scope of UL 180 includes Aboveground Piping Systems as seen in Claus 1.2, c):

1 Scope

1.1 This Standard covers construction and performance requirements for the tank accessories identified in Clause 1.2, for use on atmospheric aboveground tanks not exceeding 19,927 L (5,000 U.S. gal) which are intended for the storage and supply of heating fuels for oil burning equipment, diesel fuels for compression ignition engines, motor oils (new or used) for automotive service stations, and similar combustible liquid applications.

In addition to this Standard's traditional safety requirements for tank accessories that primarily evaluate functional operation, structural integrity, and mitigate fire and environmental hazards from loss of liquid containment under expected normal conditions; optional construction and/or performance requirements, and associated ratings, intended to address more severe conditions associated with the effects of Climate Change are included in Appendix B.

1.2 These requirements cover the following tank accessories intended for installation in, on or connected to the storage tank or supply tank in accordance with the manufacturer's instructions:

a) Liquid Level Gauges – mechanical float, low-voltage electric, or other types with integral or remote indicators;

b) Fill Signal Devices –indicating devices with audible and/or visual signals, including "whistle vent" alarms;

c) Aboveground Piping Systems – aboveground pipe and fittings for tank fill & venting and supply of utilization equipment, including flexible hose; and

d) Fill Pipe Covers & Vent Pipe Caps.

The definition of Aboveground Piping System used by UL 180 includes Fill & Vent Pipe, as well as Supply Pipe as seen in Clause 4.3, a) and 4.3, d):

4.3 ABOVEGROUND PIPING SYSTEMS – Combinations of small diameter pipe, tubing, or hose and their connection or termination fittings for containment and transfer of combustible liquids in applications identified in the scope of this Standard. Aboveground piping system may be of different containment designs for different application types:

a) Fill & Vent Pipe – Intended for transfer of liquids from a delivery truck to a supply tank and venting of displaced vapors in the tank during fill operations. Vent pipe also provides combined normal and emergency venting of the tank. These pipes are typically rigid types in the 25.4 mm to 101.6 mm (1.0 in to 4.0 in) size range;

b) Flexible Hose – Special highly flexible hose connectors of short length/small diameter intended for transfer of liquids typically from a supply pipe end to the utilization equipment, where tight bending and frequent disconnection for installation and maintenance is required. Flexible hose are typically elastomeric hose with metal braid sleeves in a 1/4" to 3/8" size range;

c) Special piping/tubing – Engineered piping or tubing that does not conform to common tubing standards (i.e. Schedule or SDR) for dimension or wall thickness as part of an engineered piping system for filling and venting of above ground combustible liquid tanks; or

d) Supply Pipe – Intended for transfer of liquids from a fuel storage tank or supply tank to utilization equipment, such as an oil burner or diesel generator. These pipes are typically flexible in the 9.5 mm to 25.4 mm (3/8 in to 1.0 in) size range.

There is even an entire Section of UL 180 (*6 Aboveground Piping System Construction*) dedicated to the construction of piping systems, the type of pipe and fittings that are approved, and their respective standards.

Proposal M87-24 also seeks to remove the standards ASME B16.51 "*Copper and Copper-Alloy Press-Connect Pressure Fittings*" and ASTM B280 "*Seamless Copper Tube for Air Conditioning and Refrigeration Field Service*."

ASME B16.51 has a scope which covers only "...pressure fittings for use with hard-drawn seamless copper water tube conforming to ASTM B88 for piping systems conveying water."

ASTM B280 has a scope which covers only "...copper tube intended for use in the connection, repairs, or alterations of air conditioning or refrigeration units in the field."

It is our understanding that these standards were used in lieu of applicable standards available at the time. The Code will be more accurate and less confusing with these two inappropriate references removed from the Table. Removal of these standards from this table will decrease the likelihood of inappropriate products being used in a fuel oil application.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 469

M89-24

IMC®: SECTION 202 (New), 309.2 (New)

Proposed Change as Submitted

Proponents: Clayton Trevillyan, City of Tucson, City of Tucson (clayton.trevillyan@tucsonaz.gov); Pete Quintela, Miami-Dade County, Miami-Dade County; Jane Gilbert, Miami-Dade County, Miami-Dade County (jane.gilbert@miamidade.gov); Stefano Schiavon, University of California, Berkeley, Self (schiavon@berkeley.edu); Ali Frazzini, Los Angeles County Chief Sustainability Office (afrazzini@cso.lacounty.gov); Mary Wright, City of Phoenix/Office of Heat Response and Mitigation, self

2024 International Mechanical Code

Add new definition as follows:

DESIGN COOLING DAY. A design parameter where air conditioning loads are determined.

Add new text as follows:

309.2 Cooling systems. Interior spaces intended for human occupancy shall be capable of maintaining an indoor temperature at or below 80°F (27°C) in the occupied zone 3 feet (914 mm) above the floor and at least 2 feet (610 mm) from exterior walls on the *design cooling day.* Where permanently installed fans capable of generating 120 fpm (0.6 m/s) air speed within the occupied zone, the indoor temperature during the *design cooling day* shall be maintained at or below 85°F (29°C). The installation of one or more portable systems shall not be used to achieve compliance with this section. **Exception:** Cooling systems shall not be required for the following:

1. Interior spaces where the primary purpose is not associated with human comfort.
2. Group F, H, S and U occupancies.

Reason: The building code requires minimum heating of spaces for the safety of the occupants. The code is silent on requirements for cooling, despite the negative impacts of elevated exterior thermal conditions on humans. The built environment is a safe haven from the effects of weather and climatic conditions, heat not being an exception for people to seek shelter from the elements. Media attention to heat-related health emergencies on the elderly and people in underserved communities demonstrates the need for improvements in the built environment[1]. As a result of increased summer temperatures, some jurisdictions have already mandated cooling be provided in new buildings and many others are considering extreme heat related ordinances. A coordinated application in the codes that can be consistently applied to new construction is warranted due to the trend in local agencies with differing requirements throughout the county.

The proposal is a performance specification to ensure safety in the built environment due to higher expected summer thermal conditions. The solution can either be active or passive systems, or a combination of these systems to provide relief from elevated thermal conditions. The active systems would include traditional central mechanical air conditioning systems that are provided in most modern homes and do not represent a significant change to how most buildings are constructed. Passive cooling systems utilize unique design features of the building that prevent heat from entering the building and/or removing heat from the building. Passive design applications include building orientation, insulation, solar control (shading and landscaping), ventilation and other methods that naturally, and without input energy, would provide and maintain thermal comfort. Passive systems could be more cost effective in both the short term and the long term as compared to active mechanical systems for circumstances where a few design changes could comply with specified interior temperature. The interior temperature of 80°F was selected as the maximum temperature for the thermal comfort of the interior environment based on ANSI/ASHRAE Standard 55-2020[2] and generally at, or above the temperature in most local ordinances.

The second sentence recognizes that air movement provides a cooling effect as experienced by the occupants of the building. ASHRAE Standard 55-2020 states that air movement of only 120 feet per minute results in the perception of 5°F cooler temperatures. Where permanent fans are installed, the resulting interior maximum temperature can be increased 5°F above the baseline temperature of 80°F that would be required for either the active or passive systems installed in accordance with the first sentence of the code change proposal. This is an additional cost-effective manner to provide the minimum cooling effect on human bodies where thermal comfort and

safety is provided in the built environment. Permanently installed fans can include ceiling fans, wall-mounted fans, bladeless ceiling fans, or any permanently installed fan that can be verified at the time of final inspection that the equipment is installed.

The third sentence is a carryover from the heating requirement, where the expectation for compliance is permanently installed equipment that can be utilized by the occupant as needed for thermal comfort and lifesaving opportunities from dangerous heat related health considerations.

Bibliography: (1) Kenny, Glen P., Jane Yardley, Candice Brown, Ronald J. Sigal, and Ollie Jay. "Heat Stress in Older Individuals and Patients with Common Chronic Diseases." CMAJ 182, no. 10 (July 13, 2010): 1053–60. https://doi.org/10.1503/cmaj.081050.

(2) ANSI/ASHRAE 55-2020: Thermal Environmental Conditions for Human Occupancy. Atlanta, GA, US: ASHRAE, 2020.

(3) RSMeans https://www.businesshue.com/commercial-hvac-cost-per-square-foot/.

(4) Energy Trust https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf.

(5) IEA https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 - $31+ per square foot of new or renovated habitable buildings.
The immediate cost impact to construction is for newly constructed or renovated buildings. There is no immediate cost to existing buildings. This value ranges greatly depending on variables that include but are not limited to:

- If the proposed construction would include cooling regardless of this code change. Zero cost impact will apply to many regions and project scopes for new permits.
- If the project includes a system that can be further supplemented at relatively low cost due to other air handling equipment that would have otherwise been included in the project scope.
- The method of proposed cooling and quality of equipment.
- Level of efficiency and sustainability of system design.
- The climate zone of project area.

Estimated Immediate Cost Impact Justification (methodology and variables):

1. Estimation from major HVAC contractor (Watsco)

"There are a lot of variables (i.e. size of the building, type of system, region, needs, installation costs). Below are some rough estimates"

- For commercial buildings the average cost can range from $15 to $30 per sq ft for a basic system but can go up to $40+ for more complex or high efficiency systems.
- For multi-family buildings the average cost can range from $2,500-$5,000 per unit for a basic system increasing in price for high efficiency units. ($40 pf @ 2 units for 4000 sf)

Comparison necessary to isolate cost of heating systems alone (e.g. furnace/boiler systems) to identify cost differential.

2. RSMeans Data (remeansonline.com)

$8-30 per sf
https://www.businesshue.com/commercial-hvac-cost-per-square-foot/

3. AC cost report (page 28)

https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf

4. Report from IEA, claiming that fans are the best affordable and available active cooling technology.

https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year

M89-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of the proposal. The committee agreed that the proposal required more specificity, as the references are not correct. The committee would like to see this proposal come back at the CAH2 hearings.

M89-24

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202, 309.2

Proponents: Clayton Trevillyan, City of Tucson, City of Tucson (clayton.trevillyan@tucsonaz.gov) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Mechanical Code

Delete without substitution:

~~**DESIGN COOLING DAY.** A design parameter where air conditioning loads are determined.~~

Revise as follows:

309.2 Cooling systems. Dwelling units and sleeping units located in Climate Zones 0, 1, 2, 3, 4, 5A, and 5B, where the summer dry-bulb temperature is greater than 85°F (29.4°C), ~~Interior spaces intended for human occupancy~~ shall be provided with cooling systems capable of maintaining an indoor temperature at or below 80°F (26.7°C) in the occupied space ~~zone 3 feet (914 mm) above the floor and at least 2 feet (610 mm) from exterior walls on the *design cooling day*~~. Where permanently installed fans capable of generating 120 fpm (0.6 m/s) air speed ~~within~~ inside the occupied ~~zone~~ space, the ~~indoor temperature during the *design cooling day*~~ required cooling system shall be capable of ~~maintained~~ maintaining indoor temperature at or below 85°F (29.4°C). The installation of one or more portable systems shall not be used to achieve compliance with this section.

Exception: Cooling systems shall not be required for ~~the following~~:

~~1.~~ Interior spaces where the primary purpose is not associated with human comfort.

~~2. Group F, H, S and U occupancies.~~

Reason: CAH2 Reason Statement:

Code proposal M89-24 has been revised in response to comments received before, during and after the first Committee Action Hearings. The Extreme Heat Working Group has reviewed all comments received and has directly engaged additional industry experts to provide the committee with the best possible revision.

The primary arguments opposing the initial code modification identified 1) the need to specify which occupancy groups this code would apply to 2) a lack of prescriptive climate zones that the code proposal includes and 3) a lack of design condition specificity that incorporates wet and/or dry bulb temperature ranges. The revised code language now focuses on the intended occupancies that must comply by specifying in the first sentence 'dwelling units and sleeping units' thereby exempting all other occupancies. This focused applicability is intended to provide a safe haven for the public seeking shelter from extreme heat events in the most functional location.

The proposed definition has been omitted altogether to reduce possible confusion. This definition was brought up by a committee member during the hearings as the definition was unclear. It was also identified that the term 'air conditioning' in the proposed definition contradicted the working group's intent to allow a variety of cooling methods.Climate zones 0-5B and a dry bulb temperature threshold have also been added to the first sentence to provide explicit charging language to regions that will be most impacted by heat waves. A floor modification was proposed and approved by the committee to eliminate Climate Zones 5C, 6, 7, and 8. This was relocated from the exceptions to the beginning of the code section as suggest by a testifier at the hearings.

The working group acknowledges that relative humidity must also be considered and that regional differences should be considered by the adopting authority. The proposed temperature threshold is consistent with other regulations that consider heat index and relative humidity. The working group's intent is to allow enough flexibility in the code language to support all reasonable methods of cooling appropriate for the local climatic conditions.

Clarity has also been provided by rewording the allowance for air movement inside the occupied space to eliminate possible confusion related to the location of air movement equipment, as noted by a committee member during discussion portion of the committee motion for disapproval. During this comment, it was also noted by the same committee member that this is an important point, which motivated the clarification. Another committee member noted that the heating requirement is in the IBC, implying it may not be in the IMC. The heating requirement is in the IBC, IRC and IMC Section 309. Placing this requirement in the IMC is appropriate since heating is also provided for. Please note, the working group has also proposed mandatory cooling in the International Building Code, the International Residential Code, and the Property Maintenance code in addition to the current proposal for the International Mechanical Code. Every effort will be made to provide consistent code proposals for the Group B Committee Action Hearings for volumes not included in Group A.

Bibliography: (1) Kenny, Glen P., Jane Yardley, Candice Brown, Ronald J. Sigal, and Ollie Jay. "Heat Stress in Older Individuals and Patients with Common Chronic Diseases." CMAJ 182, no. 10 (July 13, 2010): 1053–60. https://doi.org/10.1503/cmaj.081050.

(2) ANSI/ASHRAE 55-2020: Thermal Environmental Conditions for Human Occupancy. Atlanta, GA, US: ASHRAE, 2020.

(3) RSMeans https://www.businesshue.com/commercial-hvac-cost-per-square-foot/.

(4) Energy Trust https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf.

(5) IEA https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 - $31+ per square foot of new or renovated habitable buildings.

The immediate cost impact to construction is for newly constructed or renovated buildings. There is no immediate cost to existing buildings. This value ranges greatly depending on variables that include but are not limited to:

- If the proposed construction would include cooling regardless of this code change. Zero cost impact will apply to many regions and project scopes for new permits.
- If the project includes a system that can be further supplemented at relatively low cost due to other air handling equipment that would have otherwise been included in the project scope.
- The method of proposed cooling and quality of equipment.
- Level of efficiency and sustainability of system design.
- The climate zone of project area.

Estimated Immediate Cost Impact Justification (methodology and variables):

1. Estimation from major HVAC contractor (Watsco)"There are a lot of variables (i.e. size of the building, type of system, region, needs, installation costs). Below are some rough estimates"

- For commercial buildings the average cost can range from $15 to $30 per sq ft for a basic system but can go up to $40+ for more complex or high efficiency systems.
- For multi-family buildings the average cost can range from $2,500-$5,000 per unit for a basic system increasing in price for high efficiency units. ($40 pf @ 2 units for 4000 sf)

Comparison necessary to isolate cost of heating systems alone (e.g. furnace/boiler systems) to identify cost differential.

2. RSMeans Data (remeansonline.com)

$8-30 per sf

https://www.businesshue.com/commercial-hvac-cost-per-square-foot/

3. AC cost report (page 28)

https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf

4. Report from IEA, claiming that fans are the best affordable and available active cooling technology.

https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year

Comment (CAH2)# 637

SP3-24

ISPSC: SECTION 202, SECTION 202 (New), SECTION 303, 303.1, 303.1.2 (New), TABLE 303.1.2 (New), 303.1.3 (New), 303.1.1, 303.1.2, 303.1.3, 303.2, 303.3, DOE (New)

Proposed Change as Submitted

Proponents: Maureen Guttman, Senior Fellow, Energy Solutions, California Investor-Owned Utilities

2024 International Swimming Pool and Spa Code

SECTION 202
DEFINITIONS

Add new definition as follows:

SITE-RECOVERED ENERGY. Waste energy recovered at the building site that is used to offset consumption of purchased energy supplies.

SOLAR THERMAL WATER HEATER. An assembly of components designed to heat water through the conversion of incident solar radiation at the building site.

SECTION 303
ENERGY

Revise as follows:

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and permanent spas shall be controlled by the requirements in Sections 303.1.1 through ~~303.1.3~~ 303.1.4 and with Section 317.

Add new text as follows:

303.1.1 Primary heating systems. The primary pool or spa heating system shall be one of the following:

1. A *solar thermal water heater* with a solar collector surface area equivalent to at least 65 percent of the pool or spa surface area.
2. A heat pump pool heater.
3. Systems that do not use *solar thermal water heaters* or heat pump pool heaters as their primary heat source shall derive no less than 60 percent of annual heating energy from *on-site renewable energy* or *site-recovered energy*.

Exceptions:

1. *Residential* pools and *residential* spas.
2. Portable electric spas.
3. A pool or spa heated only by a *solar thermal water heater*.

303.1.2 Pool heater efficiency. Pool heaters shall meet the minimum efficiency requirements of Table 303.1.2 when tested in accordance with the test procedure listed in DOE 10 CFR 430.23(p) and Appendix P to Subpart B of Part 430.

TABLE 303.1.2 POOL HEATER MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	MINIMUM EFFICIENCY
Heat Pump Pool Heater	4.0 COP rated at 50° F db 44.2° F wb outdoor air 80.0° F entering water
Gas-Fired Pool Heater	*Before 5/31/2028* *Integrated Thermal Efficiency not less than the following:* *600 (PE)/(PE + 1,619)* *where PE is the active electrical power, in Btu/h* *After 5/31/2028* *82% Et* *Before 5/31/2028* *84(QIN + 491)/(QIN + 2,536)* *where QIN is the input capacity, in Btu/h* *After 5/31/2028*

303.1.3 Heater controls. Heater controls and ignition pilots shall comply with Section 303.1.3.1 through Section 303.1.3.3.

Revise as follows:

~~**303.1.1**~~ **303.1.3.1** ~~**Heaters**~~ **Electric switches.** The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. ~~Gas-fired heaters shall not be equipped with continuously burning ignition pilots.~~

~~**303.1.2**~~ **303.1.3.2 Time switches.** Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- or waste-heat recovery pool heating systems.

~~**303.1.1**~~ **303.1.3.3** ~~**Heaters**~~ **Ignition pilots.** ~~The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater.~~ Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

~~**303.1.3**~~ **303.1.4 Covers.** Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means in accordance with Section 104.9.1.

Exception: Where more than 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from a heat pump or an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

303.2 Portable spas. The energy consumption of electric-powered portable spas shall be controlled by the requirements of APSP 14.

303.3 Residential pools and permanent residential spas. The energy consumption of *residential* swimming pools and permanent *residential* spas shall be controlled in accordance with the requirements of APSP 15.

Add new standard(s) as follows:

DOE 10 CFR Part 430. Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule; Pool heaters

Reason: This proposal, based on pool heater requirements proposed for California's 2025 energy code, requires that the primary heating system for pools and spas is either a solar thermal water heater, a heat pump pool heater or a heating system that derives no less than 60 percent of its annual heating energy from either on-site renewable energy or site-recovered energy. Natural gas or electric back-up heating systems are allowed in all cases. The proposal also includes mandatory minimum efficiency standards for pool heaters established by the U.S. Department of Energy.

The purpose of this proposal is to save energy and reduce carbon emissions from new swimming pool and spa heaters. According to CBECS 2018, the majority of pool and spa heaters installed today to heat indoor commercial pools are powered with natural gas (71%) which ties building owners to unpredictable utility costs caused by price swings in the natural gas market.

Solar thermal heating systems are cost effective alternatives to conventional gas-fired pool heaters which result in reduced energy use and lower monthly utility costs. Solar swimming pool and spa heating systems are one of the simplest and least expensive forms of solar thermal technology. The most common and least expensive type of solar swimming pool and spa heating systems are unglazed solar collectors which are made of a black plastic material that absorbs the sun's energy, converting it into heat which is then transferred to the water in the pool. Unglazed solar collectors are popular for swimming pools because they are easy to install, require little to no maintenance, and result in significantly lower monthly utility bills.

While a solar thermal heater with a backup gas-fired pool heater is more expensive than installing just a gas-fired pool heater (incremental costs are around $5,250 for a 20,000 gallon capacity pool), the reduction in monthly utility costs results in very short payback periods. A recent California CASE Study found that installing a solar pool and spa heating system with gas-fired back-up reduces natural gas use by 64 therms/year for residential pools and 45,000 therms/year for an Olympic sized pool. The same CASE study found that the reduction in natural gas use over 30 years resulted in a reduction in utility bills for solar pool and spa heating systems that were two to six times higher than the incremental cost for installing the system. The Department of Energy similarly states that the payback period for a solar pool and spa heating system alone is on the order of 1 to 7 years.

Not only do solar thermal water heaters result in reduced utility bills, but they can also reduce carbon emissions. The California CASE Study found that this requirement would reduce greenhouse gas emissions in California by approximately 37,000 metric tons of CO_2e per year. Given that commercial pools in California make up roughly 20% of the commercial pool market in the U.S., this proposal, if adopted nationwide, could result in a reduction of roughly 190,000 metric tons of CO_2e per year which is equivalent to taking 42,000 cars off the road.

As an alternative to installing a solar thermal heating system, this proposal allows for the installation of heat pump pool heaters or pool heaters which derive at least 60 percent of their annual heating energy from either on-site renewable energy or site-recovered energy. The California CASE study found that heat pump pool heaters save more energy and are more cost effective than solar thermal heating systems. This proposal exempts residential pools and spas and portable electric spas.

Bibliography: U.S. Department of Energy. *Solar Swimming Pool Heaters*. Accessed December 15, 2023. https://www.energy.gov/energysaver/solar-swimming-pool-heaters

California Energy Codes and Standards. *Codes and Standards Enhancement (CASE) Initiative 2025 California Energy Code: Swimming Pool Heating*. Revised October 2023. https://title24stakeholders.com/wp-content/uploads/2023/10/Revised-2025-T24-Final-CASE-Report_-NR-Swimming-Pool-Spa-Heating-1.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The California CASE study found that installing a solar thermal water heaters in addition to a gas-fired pool heating system in nonresidential pools resulted in total 30-year incremental installation and maintenance costs of $18,786. The California CASE study found that heat pump pool heaters in addition to a gas-fired pool heating system result in $17,416 in incremental installation and maintenance costs over 30 years.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated immediate incremental cost assumed that the owner installed a solar thermal water heater or a heat pump pool heater as the primary system and a gas heater as back-up. The incremental cost therefore is the full installed cost of solar thermal water heater or heat pump pool heater. The cost of the solar collectors was estimated from a database of installation cost values from the California Solar Initiative Commercial Pool Solar Thermal Rebate program. The database contains over 1,100 commercial pool solar thermal projects with data on the collector size and total project cost.

Estimated Life Cycle Cost Impact:

Over 30 years, the CASE study found that solar thermal water heaters saved between $38,000 to $150,000 for non-residential pools yielding a benefit to cost ratio between 2.0 to 6.6 depending on the Climate Zone. If one includes the immediate and maintenance costs for the solar thermal water heaters, total life cycle cost savings over 30 years are between $19,214 and $131,214 depending on the Climate Zone.

Over 30 years, the CASE study found that heat pump pool heaters saved between $40,697 to $202,301 for consumers yielding a benefit to cost ratio between 2.3 to 11.6 depending on the Climate Zone. If one includes the immediate and maintenance costs for the solar thermal water heaters, total life cycle cost savings over 30 years are between $23,281 and $184,885 depending on the Climate Zone.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The methodology and variables for the life cycle cost impact calculation are descripted in the CASE study.

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 10CFR Part 430 *Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule; Pool heaters*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

SP3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: These are proposed California requirements that are not appropriate for the ISPSC. (11-0)

SP3-24

Individual Consideration Agenda

Comment 1:

ISPSC: SECTION 202, 303.1, 303.1.1 (New), 303.1.2 (New), 303.1.2, TABLE 303.1.2, 303.1.2.1 (New), 303.1.2.2 (New), 303.1.3 (New),

303.1.3.1 (New), 303.1.3, 303.1.4.1 (New), 303.1.3.2, 303.1.3.3, 303.1.4, DOE (New), DOE

Proponents: Maureen Guttman, Energy Solutions, California Investor-Owned Utilities requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Swimming Pool and Spa Code

SOLAR THERMAL ~~WATER~~ POOL HEATER. An assembly of components designed to heat water for swimming pools or spas by solar thermal means, excluding pool recirculation components. ~~through the conversion of incident solar radiation at the building site.~~

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and permanent spas shall be controlled by the requirements in Sections 303.1.1 through ~~303.1.4~~ 303.1.5 and with Section 317.

303.1.1 Primary heating systems. The primary pool or spa heating systems shall be one of the following:

1. ~~2.~~ A heat pump pool heater.
2. ~~1.~~ A solar thermal pool ~~water~~ heater with a solar collector surface area equivalent to at least 65 percent of the pool or spa surface area.
3. Systems that do not use heat pump pool heaters or solar thermal pool ~~water~~ heaters or ~~heat pump pool heaters~~ as their primary heat source shall derive no less than 60 percent of annual heating energy from on-site renewable energy orsite-recovered energy.
4. A combination of solar thermal pool heater and heat pump pool heater without external supplementary heat.

Exceptions:

1. Residential pools and residential spas.
2. Portable electric spas.
3. Pool heating systems in Climate Zone 8 as identified Section 301 in the International Energy Conservation Code.
4. ~~3.~~ A pool or spa heated only by a solar thermal ~~water~~ pool heater.
5. Replacements to gas-fired heating systems for pools and spas in existing buildings.
6. A pool heating system whose annual site energy consumption is no greater than any of the pool heating systems compliant with Section 303.1.1 as determined by an approved party.

Add new text as follows:

303.1.2 Heat pump pool heater sizing. The design loads for the purpose of sizing systems and equipment for heat pump pool heaters shall comply with Sections 303.1.2.1 and 303.1.2.2.

~~**303.1.2 Pool heater efficiency.** Pool heaters shall meet the minimum efficiency requirements of Table 303.1.2 when tested in accordance with the test procedure listed in DOE 10 CFR 430.23(p) and Appendix P to Subpart B of Part 430.~~

~~**TABLE 303.1.2 POOL HEATER MINIMUM EFFICIENCY REQUIREMENTS**~~

~~EQUIPMENT TYPE~~	~~MINIMUM EFFICIENCY~~
~~Heat Pump Pool Heater~~	~~4.0 COP rated at 50°F db 44.2°F wb outdoor air 80.0°F entering water~~

~~Gas-Fired Pool Heater~~	~~Before 5/31/2028~~ ~~Integrated Thermal Efficiency not less than the following:~~ ~~600 (PE)/(PE + 1,619)~~ ~~where PE is the active electrical power, in Btu/h~~ ~~After 5/31/2028~~ ~~82% Et~~ ~~Before 5/31/2028~~ ~~84(QIN + 491)/(QIN + 2,536)~~ ~~where QIN is the input capacity, in Btu/h~~ ~~After 5/31/2028~~

303.1.2.1 Indoor pools and spas. Heat pump pool heaters serving indoor pools and spas shall comply with one of the following:

1. Heat pump pool heaters shall be sized in accordance with the manufacturer's published sizing guidelines.
2. Heat pump pool heaters without manufacturer's published sizing guidelines shall be sized in accordance with generally accepted engineering standards.

Add new text as follows:

303.1.2.2 Outdoor pools and spas. Heat pump pool heaters serving outdoor pools and spas shall comply with one of the following:

1. Heat pump pool heaters shall be sized in accordance with the manufacturer's published sizing guidelines.
2. Heat pump pool heaters without manufacturer's published sizing guidelines shall be sized using an output heating capacity no less than O_{out} calculated in accordance with Equation 3-1. **Oout = Vp x 8.33 x ΔT ÷ t (Equation 3-1)**
   where:

   O_{out} = output heating capacity of the heat pump pool heater in Btu/hr

   Vp = pool volume in gallons

   ΔT = desired pool temperature minus the average temperature for the coldest month and shall not exceed 10°F, in °F

   t = time needed for the heat pump pool heater to achieve the 10°F rise, and shall not exceed 17.5 hours, in hours

303.1.3 Supplementary pool and spa heating. Supplementary pool and spa heating systems shall be permitted if the primary pool and spa heating system does not meet the full annual heating load of the pool or spa.

303.1.3.1 Control of supplementary pool heating system. Pool and spa heating systems with an internal or an external supplementary pool heating system shall have controls that prevent supplementary heat operation when the heating load can be met by the primary pool heating system alone. Supplementary pool and spa heating system operation is permitted for setback recovery.

~~**303.1.3**~~ **303.1.4 Heater controls.** Heater controls and ignition pilots shall comply with Section ~~303.1.3.1~~ 303.1.4.1 through Section ~~303.1.3.3~~ 303.1.4.3.

~~**303.1.3.1**~~ **303.1.4.1 Electric switches.** The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater.

~~303.1.3.2~~ 303.1.4.2 **Time switches.** Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- or waste-heat recovery pool heating systems.

~~303.1.3.3~~ 303.1.4.3 **Ignition pilots.** Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

~~303.1.4~~ 303.1.5 **Covers.** Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means in accordance with Section 104.9.1.

Exception: Where more than 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from a heat pump or an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

Delete without substitution:

~~**DOE 10 CFR Part 430.** Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule; Pool heaters~~

Reason:

This proposal is a modified version of a proposal submitted and considered at the ICC Committee Action Hearings in April. The modifications to the proposal are intended to better align this proposal with changes discussed and agreed to with pool and spa industry representatives. The principal modifications include:

1. An exemption for replacements for existing gas-fired pool heaters to account for the unique challenges facing existing buildings.
2. An exemption for pool heating systems whose site energy use consumption is less than that of the four options provided.
3. Guidance on how to appropriately size heat pump pool heaters if installed.
4. Guidance on appropriate control requirements for supplementary heating.

In addition, this proposal includes the following additional changes:

1. The proposal revises the definition for solar thermal pool heater to be consistent with the definition in the 2020 ICC 902/PHTA 902/SRCC 400 Solar Pool and Spa Heating System Standard.
2. The proposal exempts pool heating systems in Climate Zone 8 where cost effectiveness analysis shows that solar thermal pool heating systems are not appropriate.
3. The proposal removes the mandatory minimum efficiency standards for pool heaters established by the U.S. Department of Energy as well as a minor restructuring of the heaters section. Those proposed changes are included in a separate proposal.

As stated in the original reason statement, the purpose of this proposal is to save energy and reduce carbon emissions from new swimming pool and spa heaters. According to CBECS 2018, the majority of pool and spa heaters installed today to heat indoor commercial pools are powered with natural gas (71%) which ties building owners to unpredictable utility costs caused by price swings in the natural gas market.

Cost Impact: Increase

Estimated Immediate Cost Impact:

While additional exemptions provided for existing buildings, systems in Climate Zone 8, and systems whose annual site energy use consumption is lower than that of the options allowed will reduce costs nationally, the revisions made to the original proposal do not impact the cost of the proposal to an individual installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

N/A

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 651

Comment 2:

ISPSC: 303.1, TABLE 303.1.2, 303.1.3 (New), 303.1.3.2, 303.1.3.3, 303.1.4, 303.1.3

Proponents: Maureen Guttman, Energy Solutions, California Investor-Owned Utilities requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Swimming Pool and Spa Code

303.1 Energy consumption of pools and permanent spas. The energy consumption of pools and permanent spas shall be controlled by the requirements in Sections 303.1.1 through ~~303.1.4~~ 303.1.6 and with Section 317.

Revise as follows:

TABLE 303.1.2 POOL HEATER MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	MINIMUM EFFICIENCY	COMPLIANCE DATE
Commercial Heat Pump Pool Heater[a]	4.0 COP rated at 50°F db 44.2°F wb outdoor air ~~80.0°F entering water~~	
Consumer Electric Pool Heater[b]	4.0 COP rated at 50°F db 44.2°F wb outdoor air 80.0°F entering water	Before 5/31/2028
	~~Before 5/31/2028~~ Integrated Thermal Efficiency not less than the following: 600 (PE)/(PE + 1,619) where PE is the active electrical power, in Btu/h	On or after 5/31/2028
Commercial Gas-Fired Pool Heater[a]	~~After 5/31/2028~~ ~~82% Et~~ ~~Before 5/31/2028~~ ~~84(QIN + 491)/(QIN + 2,536)~~ ~~where QIN is the input capacity, in Btu/h~~ ~~After 5/31/2028~~	

Consumer Gas-Fired Pool Heater[b]	*82% Et*	*Before 5/31/2028*
	$84(Q_{IN} + 491)/(Q_{IN} + 2,536)$ where Q_{IN} is the input capacity, in Btu/h	On or after 5/31/2028

a. Performance requirement is for commercial pool heaters and for applications outside of the U.S. Commercial pool heaters contain additional design modifications related to safety requirements for installation in commercial buildings and are not regulated as consumer products by the U.S. DOE as defined in 10 CFR 430.

b. Pool heaters in this category or subcategory are regulated as consumer products by the U.S. DOE as defined in 10 CFR 430.

~~**303.1.3.1**~~ **303.1.3** ~~**Electric switches**~~ **Heater electric switches.** The electric power to heaters shall be controlled by an on-off switch with ready access that is an integral part of the heater, mounted on the exterior of the heater or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater.

~~**303.1.3.2**~~ **303.1.4 Time switches.** Time switches or other control methods that can automatically turn off and on heaters and pump motors according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Pumps that operate solar- or waste-heat recovery pool heating systems.

~~**303.1.3.3**~~ **303.1.5** ~~**Ignition pilots**~~ **Gas-fired heater ignition pilots.** Gas-fired heaters shall not be equipped with continuously burning ignition pilots.

~~**303.1.4**~~ **303.1.6 Covers.** Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means in accordance with Section 104.9.1.

Exception: Where more than 75 percent of the energy for heating, computed over an operating season of not fewer than 3 calendar months, is from a heat pump or an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

~~**303.1.3 Heater controls.** Heater controls and ignition pilots shall comply with Section 303.1.3.1 through Section 303.1.3.3.~~

Reason:

This proposal is a modified version of a proposal submitted and considered at the ICC Committee Action Hearings in April. The original proposal was split into two parts. This proposal is intended to improve compliance and enforcement across a jurisdiction's adopted codes and with DOE's minimum efficiency standards for pool heaters by both aligning and clarifying code requirements.

This proposal aligns heater efficiency requirements with mandatory minimum efficiency standards for pool heaters established by the U.S. Department of Energy(DOE) and those established by the 2024 IECC and ASHRAE 90.1-2022. In 2024, minimum efficiency requirements for consumer gas-fired pool heaters with an efficiency of 82% Et are in place. DOE finalized a rule requiring manufacturers of consumer gas-fired pool heaters and consumer electric pool heaters meet new efficiency standards and new metrics beginning 5/31/2028. In addition, the 2024 IECC and ASHRAE 90.1-2022have included minimum efficiency requirements for pool heaters not covered by DOE's minimum efficiency standards. This proposal is intended to align the 2027 ISPSC with both federal requirements and requirements in the 2024 IECC and ASHRAE 90.1-2022.

To clarify pool heater requirements, this proposal also revises the heater controls section by removing the requirement that gas-fired heaters are not equipped with continuously burning ignition pilots and making that its own section.

Bibliography: N/A

Cost Impact: Increase

Estimated Immediate Cost Impact:

There is no cost impact to the original proposal as a result of this modification.

Estimated Immediate Cost Impact Justification (methodology and variables):

N/A

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 693

SP17-24

ISPSC: SECTION 202 (New), SECTION 202, 316.4.1

Proposed Change as Submitted

Proponents: Gregory Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Add new definition as follows:

FREEBOARD. The vertical distance between the operating level of the pool and the level where the water would spill beyond the pool or onto the deck. For a pool with a vanishing edge, or where the coping is lower than the design pool water level, the freeboard would be zero.

Revise as follows:

SURGE CAPACITY. The storage volume in a surge tank, *gutter,* and plumbing lines that is available during operation of the pool to temporarily hold water that has been displaced from the pool by bathers, without diverting that water to waste. Water held in surge capacity shall not be in motion due to gravity, rather, only by the pumps.

316.4.1 Surge capacity. Where perimeter surface skimming systems are used, they shall be connected to a circulation system with a system surge capacity of not less than ~~1~~ 0.5 gallon for each square foot (~~40.7~~ 20.4 liters per square meter) of water surface, unless there is 2 inches (51 mm) or more of freeboard around the entirety of the pool perimeter. The capacity of the perimeter overflow system and related piping is permitted to be considered as a portion of the surge capacity.

Reason: The purpose of surge capacity is poorly understood. The idea of surge capacity is to allow the pool to fill up with people and empty out without having to divert the displaced water to waste.

1. Surge capacity should not be required on pools with adequate freeboard, because they will not dump water to waste during a high bather load event. Some pools, such as vanishing edge pools or tension edge pools, would not have adequate freeboards, for example.
2. Areas that only ever have water in motion (such as gutter pipes and gutter trenches) should not count as surge capacity, because these areas typically cannot fill up with water. For example, consider a vanishing edge pool with no main drain that has a section of sloping gutter pipe above the catch basin static water level. This pipe does not get fuller when more people come into the pool. Its fullness depends on the flow rate and pipe slope only.
3. Experience shows many areas have adopted this requirement, but few enforce it, and those that do are not consistent in how they apply it. The requirement of one gallon per square foot converts to a height of about 1.75 inches of water over the pool. Surge capacity is intended to prevent water from going to waste every time a group of bathers enters the pool. Therefore, in a typical open gutter pool, with freeboard behind the gutter dropouts, water is never diverted to waste due to high bather load, and surge capacity is not needed. All that happens in that case is the water over the gutter lip temporarily grows, and this is benign.

The current definition of surge capacity expects the excess water to go to places it will not actually go, because gutter pipes typically run partially full of flowing water down a slope. The volume held in a gutter pipe is a function of the gutter flow rate, and it does not change when some volume is displaced.

Surge capacity should be more narrowly defined, and it should only be required where freeboard is low. This proposal addresses that and adds a definition for "freeboard".

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Difficult to estimate due to the differences in pool sizes and tank costs between projects.

Surge tanks range in price from $150-$10,000

Assuming a larger residential pool able to use a smaller surge tank under the proposal, the average decrease would likely be $1,000 to $2,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Listed prices of surge tanks, cost of installation would be unaffected by the tank size.

Estimated Life Cycle Cost Impact:

None.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None.

SP17-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
SURGE CAPACITY. The storage volume in a surge tank, *gutter,* and plumbing lines that is available during operation of the pool to temporarily hold water that has been displaced from the pool by bathers, without diverting that water to waste.
~~Water held in surge capacity shall not be in motion due to gravity, rather, only by the pumps.~~

316.4.1 Surge capacity.
Where perimeter surface ~~skimming~~ overflow systems are used, they shall be connected to a circulation system with a system surge capacity of not less than ~~0.5~~ 1 gallon for each square foot (~~20.4~~ 40.7 liters per square meter) of water surface~~.~~ ~~unless there is 2 inches (51 mm) or more of freeboard around the entirety of the pool perimeter. The capacity of the perimeter overflow system and related piping is permitted to be considered as a portion of the surge capacity.~~
Exception: Surge capacity is not required if the following conditions are present:

1. Automatic surface skimmers that are designed to process not less than 100 percent of the turnover rate,
2. Freeboard of 2 inches (51 mm) or more around the entirety of the pool perimeter,

316.3 Skimmer sizing.
Where automatic surface skimmers are used as the sole ~~overflow~~ skimming system, not less than one surface skimmer shall be provided for the square foot (square meter) areas, or fractions thereof, indicated in Table 316.3. Skimmers shall be located to maintain effective skimming action.

Committee Reason: For the modification: The modification provides clarity to the original proposal.(11-0)
For the proposal as modified: The proposal will reduce the needed surge capacity. (11-0)

SP17-24

Individual Consideration Agenda

Comment 1:

ISPSC: SECTION 202, SECTION 316, 316.1, 316.2, 316.2.1, 316.3, TABLE 316.3, 316.4, 316.4.1, TABLE 316.4.1 (New)

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Swimming Pool and Spa Code

FREEBOARD. The vertical distance between the operating level of the pool and the level where the water would spill beyond the pool or onto the deck. For a pool with a vanishing edge, or where the coping is lower than the design pool water level, the freeboard would be zero.

SURGE CAPACITY. The storage volume in a surge tank, *gutter,* and plumbing lines that is available during operation of the pool to temporarily hold water that has been displaced from the pool by bathers, without diverting that water to waste.

SECTION 316
~~SKIMMERS~~SURFACE SKIMMING SYSTEMS

316.1 General. The provisions of this section apply to ~~skimmers~~ surface skimming systems for pools and spas.

Exceptions:

1. Portable ~~*residential*~~ electric spas and ~~portable *residential*~~ exercise spas.
2. *Onground storable pools* supplied by the pool manufacturer as a kit that includes a skimming system that is in accordance with Section 704.

316.2 Required. A surface skimming system shall be provided for public *swimming pools* and *permanent spas,* and *residential swimming pools*. ~~Surface skimming systems shall be *listed* and *labeled* in accordance with NSF 50. Either a~~ A surface skimming system shall consist of automatic surface skimmers, or an ~~perimeter~~ overflow gutter system, or a combination of the two~~ shall be provided for permanent inground *residential* pools and permanent *residential* spas~~. Recessed automatic surface skimmers shall be *listed and labeled* in accordance with NSF 50. Where installed, surface skimming systems shall be designed and constructed to create a skimming action on the pool water surface when the water level in the pool is within operational parameters.

Exceptions:

1. Class D public pools designed in accordance with Chapter 6.
2. Skimmers that are an integral part of a spa that has been *listed* and *labeled* in accordance with UL1563 shall not be required to be *listed* and *labeled* in accordance with NSF 50.

316.2.1 Circulation systems. Public pool circulation systems shall be designed to process not less than 100 percent of the turnover rate through ~~skimmers~~their surface skimming system.

316.3 Skimmer sizing. Where automatic surface skimmers are used as the sole surface skimming system, not less than one automatic surface skimmer shall be provided for the square foot (square meter) areas, or fractions thereof, indicated in Table 316.3. Skimmers shall be located to maintain effective skimming action.

TABLE 316.3 SKIMMER SIZING TABLE

POOL OR SPA	AREA PER SKIMMER (SQ. FT)

POOL OR SPA	AREA PER SKIMMER (SQ. FT)
Public pool	500
Residential pool	800
Spas (all types)	150

For SI: 1 square foot = 0.0929 m^2.

316.4 Perimeter coverage. Where a perimeter ~~type~~ overflow gutter surface skimming system is used as the sole surface skimming system, the system shall extend around not less than 50 percent of the pool or spa perimeter.

316.4.1 Surge capacity. Where perimeter ~~surface~~ overflow gutter systems are used, they shall be connected to a circulation system with a system surge capacity of not less than the ~~1 gallon for each square foot (40.7 liters per square meter) of~~ water surface area, multiplied by the factor indicated in Table 316.4.1.

Exception: Surge capacity is not required if both of the following conditions are present:

1. Automatic surface skimmers that are designed to process not less than 100 percent of the turnover rate.
2. A minimum ~~F~~ freeboard of 2 inches (51 mm) ~~or more~~ around the entirety of ~~the~~ a pool perimeter ~~,~~ and a minimum freeboard of 4 inches (102 mm) around the entirety of a spa perimeter.

Add new text as follows:

TABLE 316.4.1 MINIMUM SURGE CAPACITY

Pool Area Type	Required surge capacity (gallons per square foot)
Spa	2
Pool area less than 1ft deep	0.5
Pool area 5 feet deep or more	0.15
All other pool areas	0.9

For SI: 1 gallon per square foot = 40.7 liters per square meter

Reason: The common meaning of "skimmer" is a single device that is about a foot wide connected to the pump suction. The Florida code and the California code both mention skimmers, meaning a single 1' wide device, without defining it, because its meaning is commonly understood.

However, the *ISPSC* uses the word "skimmer" to mean "a system of skimmers" or "the gutter" which contradicts common usage and confuses the reader. Therefore, this public comment more accurately titles this section as a "surface skimming system" as the section covers the two types of systems, skimmers and overflow gutters. This comment also aligns terms with definition changes that were adopted in SP1-24, at the first code action hearing, along with ensuring terms align with existing *ISPSC* definitions.

Section 316.2 also is cleaned up as the intent is clearly for residential pools to have the same skimming requirements as public pools, so there is no need to have separate sentences with different wordings for each set of requirements that could be confusing. The only "skimmers" that are listed and labeled to NSF 50 are Recessed Automatic Surface Skimmers, so that is also clarified.

The background for the additional changes to section 316.4.1 and new Table 316.4.1 is as follows:

- Surge is meant to absorb the displacement caused by occupants. In code action hearing #1, we approved more reliable minimum figures for the number of occupants in a pool (P19-24, Part II). The occupant will displace a volume equal to their submerged volume.
- Spas are now assigned a denser occupancy factor of one occupant per 10 square feet rather than 24 square feet. The industry is seeing a trend of spas designed with overflowing edges. If this section were left unchanged, the current 1 gallon per square foot factor would work out to each occupant in a spa displacing 10 gallons. The median adult male weight is 200 lb. while the median adult female weight is 170 lb., so 185 is the median for both sexes. For occupants weighing approximately 185 lbs., that would require each to be only 45% submerged. The proposed factor assumes that the median occupant is 90% submerged.
- Water depth of less than 1' is most likely a tanning ledge, and people do not lie down in these. They sit on the floor, or they bring a chair; therefore, less than 50% of their bodies will be submerged.
- Water depth of 5' or more is assigned 1 occupant per 150 square feet, and the proposed 0.16 factor preserves the 22.2 gallons per occupant ratio.

- For most pool areas, the occupant load will be 1 per 24 square feet, again corresponding with P19-24, Part II. For these areas, the minimum surge capacity will be 0.9 gallon per square foot, meaning 22.2 gallons are assigned per occupant. A 185 lb. occupant who is floating or fully submerged will displace 22.2 gallons of water. The median adult male weight is 200 lb. while the median adult female weight is 170 lb., so 185 is the median for both sexes, and most occupants will rest their feet on the bottom rather than float in most areas of the pool.

In summary, this public comment means to align with other proposals that were adopted in CAH#1 and made additional needed changes to further clean up this section.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Fiberglass surge tanks range in price from $150-$10,000. Under this proposal, a larger residential pool will be able to use a smaller surge tank, resulting in an average decrease in construction costs of $1,000 to $2,000.

A similar minor increase could be expected for the proposed increase in required surge capacity for permanent inground spas.

For larger public and residential pools, the product of the proportion of pool construction cost associated with the surge tank, multiplied by the reduction in the surge tank size allowed by this revision, will rarely be more than 1% of the cost to build or operate the pool, but it will be a reduction.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will result in a minor reduction in construction costs for pools and a possible minor increase in construction costs for permanent spas.

The surge capacity factor in the 2024 ISPSC is 1 gallon per square foot. This proposal calls for spas to have double that amount of surge capacity, while other pools and areas of pools will have a reduced minimum surge capacity.

While spas with overflowing edges are rare, they are currently typically being designed with greater surge capacity, to ensure safe operation of pumps in scenarios with a high number of users entering and exiting the spa.

For larger public and residential pools, the current requirement to provide surge capacity generally increases total water volume by 2% to 4% and increases the area of watertight structure by 2% to 8%. Under this proposal, this portion of the cost of pool construction would be decreased by about 10% (as the factor changes from 1 gal/sf to 0.9 gal/sf), for pools between 1' and 5' deep. For depths outside of that range, the savings would be greater.

Estimated Life Cycle Cost Impact:

No change in life cycle cost.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

No changes that have an impact on life cycle costs. All costs are first costs.

Comment (CAH2)# 378

SP29-24

ISPSC: 604.2.2, APSP Chapter 11 (New)

Proposed Change as Submitted

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com)

2024 International Swimming Pool and Spa Code

Revise as follows:

604.2.2 Reduced ~~circulation~~flow rate. ~~The circulation rate~~ The aquatic recreation facility shall be permitted to ~~be~~ reduce~~d~~ the flow rate ~~during periods that the pool is closed for use~~ when not open to bathers and provided ~~that acceptable water clarity conditions are met prior to reopening the pool for public use.~~the water quality is maintained and documented in accordance with APSP-11. Water quality shall be tested and documented prior to opening the aquatic venue to bathers. The reduced ~~circulation~~ flow rate shall not be zero~~.~~ unless approved.

APSP

Pool & Hot Tub Alliance (formerly The Association of Pool & Spa Professionals)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ANSI/APSP/ICC 11--2019 American National Standard for Water Quality in Public Pools and Spas

Reason: This change aligns the term "flow rate" which is used in PHTA–2, APSP-11, and the Model Aquatic Health Code (MAHC). The sanitation and pH guidelines incorporated by reference clarify required operation. These requirements for water quality are required by reference in other sections of the ISPSC and do not change the cost of operation.

Bibliography: ANSI/APSP/ICC-11 American National Standard for Water Quality in Public Pools and Spas

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It is a language change and clarification to ensure similar terminology ("flow rate" as opposed to "circulation rate") is used in all referenced PHTA standards and the Model Aquatic Health Code.

SP29-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The ISPSC is a construction code and not an operation and maintenance code. How is the code official able to enforce the standard after the construction is complete? Also, there is concern about allowing the code official to approve a zero flow rate. Although in favor of a radical turn down of flow rate when the pool is closed, the flow rate should not be zero in order for automated chemical monitoring equipment to maintain proper water chemistry. (11-0)

SP29-24

Individual Consideration Agenda

Comment 1:

ISPSC: 604.2.2, APSP Chapter 11

Proponents: Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Swimming Pool and Spa Code

604.2.2 Reduced flow rate. The aquatic recreation facility shall be permitted to reduce the flow rate when not open to bathers ~~and provided the water quality is maintained and documented in accordance with APSP-11~~. Water quality shall be tested and documented prior to opening the aquatic venue to bathers. The reduced flow rate shall not be zero ~~unless approved~~.

Delete without substitution:

APSP

Pool & Hot Tub Alliance (formerly The Association of Pool & Spa Professionals)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

~~ANSI/APSP/ICC-11-2019~~ ~~American National Standard for Water Quality in Public Pools and Spas~~

Reason: This public comment addresses the committees concerns and reason for disapproval.

First, it removes the requirement that the water quality be maintained and documented in accordance with APSP-11, due to the concern a code official would not be able to enforce the standard after the construction is complete.

Second, it removes the language, "unless approved," as it relates to not allowing a reduced flow rate of zero. This provided no guidance for enforcement and more importantly, runs contrary to public pool operations health and safety. PHTA has elected to remove that language to restore the sentence to its original form, addressing the committees concern.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These comments do not change the cost impact of the proposal as originally submitted.

Comment (CAH2)# 58

SP30-24

ISPSC: SECTION 202, 202, SECTION 202 (New), TABLE 604.2, SECTION 613 (New), 613.1 (New), 613.1.1 (New), 613.1.2 (New), ASTM Chapter 11 (New)

Proposed Change as Submitted

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org)

2024 International Swimming Pool and Spa Code

PUBLIC SWIMMING POOL (Public Pool). A pool, other than a *residential* pool, that is intended to be used for swimming or bathing and is operated by an owner, lessee, operator, licensee or concessionaire, regardless of whether a fee is charged for use. Public pools shall be further classified and defined as follows:

Class A competition pool. A pool intended for use for accredited competitive aquatic events such as Federation Internationale De Natation (FINA), USA Swimming, USA Diving, USA Synchronized Swimming, USA Water Polo, National Collegiate Athletic Association (NCAA), or the National Federation of State High School Associations (NFHS).

Class B public pool. A pool intended for public recreational use that is not identified in the other classifications of public pools.

Class C semi-public pool. A pool operated solely for and in conjunction with lodgings such as hotels, motels, apartments or condominiums.

Revise as follows:

Class D-1 wave action pool. A pool designed to simulate breaking or cyclic waves for purposes of general play ~~or surfing~~.
It does not include a *surf venue*, *surf basin* or *stationary wave system*.

Class D-2 activity pool. A pool designed for casual water play ranging from simple splashing activity to the use of attractions placed in the pool for recreation.

Class D-3 catch pool. A body of water located at the termination of a manufactured waterslide attraction. The body of water is provided for the purpose of terminating the slide action and providing a means for exit to a deck or walkway area.

Class D-4 leisure river. A manufactured stream of water of near-constant depth in which the water is moved by pumps or other means of propulsion to provide a river-like flow that transports bathers over a defined path that may include water features and play devices.

Class D-5 vortex pool. A circular pool equipped with a method of transporting water in the pool for the purpose of propelling riders at speeds dictated by the velocity of the moving stream of water.

Class D-6 interactive play attraction. A manufactured water play device or a combination of water-based play devices in which water flow volumes, pressures or patterns can be varied by the bather without negatively influencing the hydraulic conditions for other connected devices. These attractions incorporate devices or activities such as slides, climbing and crawling structures, visual effects, user-actuated mechanical devices and other elements of bather-driven and bather-controlled play.

Class E. Pools used for instruction, play or therapy and with temperatures above 86°F (30°C).

Class F. Class F pools are wading pools and are covered within the scope of this code as set forth in Section 405.
Public pools are either a diving or nondiving type. Diving types of public pools are classified into types as an indication of the suitability of a pool for use with diving equipment.

Type O. A nondiving public pool.

Types VI–IX. Public pools suitable for the installation of diving equipment by type.

Add new definition as follows:

STATIONARY WAVE SYSTEMS. A system that delivers a constantly flowing sheet of water nominally up to 24 in. thick travelling over a form allowing for patron interaction with a perpetual wave.

SURF BASIN. Mechanical devices to generate moving waves with suitable characteristics for surfing and can provide multiple different wave profiles suitable to any level of surfing.

SURF VENUE. A facility designed to accommodate a large body of water dedicated only to surfing on a surfboard or other similar surfing or wave-riding device, with bathymetry, shape, and design that can use a variety of different mechanisms to generate ocean like surfable waves that shoal and break progressively towards shallow water.

Revise as follows:

TABLE 604.2 TURNOVER TIME

CLASS OF POOL	MAXIMUM TURNOVER TIME[a] (hours)
D-1[b]	2
D-2 with less than 24 inches water depth	1
D-2 with 24 inches or greater water depth	2
D-3	1
D-4	2
D-5	1
D-6	1

For SI: 1 inch = 25.4 mm.

a. Pools with a sand bottom require a 1-hour turnover time.

b. Surf venues, surf basins, and stationary wave systems in compliance with Section 613 are not considered D-1 pools.

Add new text as follows:

SECTION 613
SURF VENUES, SURF BASINS, AND STATIONARY WAVE SYSTEMS

613.1 Surf venues. Surf venues shall comply with Section 613.1.1 or 613.1.2.

613.1.1 SURF basins. Surf basins shall comply with ASTM wk75193.

613.1.2 Stationary wave systems. Stationary wave systems shall comply with ASTM F3133.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor, P.O. Box C700
West Conshohocken, PA 19428-2959

F3133–21	Standard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Stationary Wave Systems
wk75193-xx	Standard Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Controlled Surf(ing) Basins

Reason: The ISPSC currently addresses surf pools within Class D-1 wave action pools; however, these are two different types of pools/systems/venues. This proposal clarifies that a D-1 wave action pool is not a surf pool by striking that current wording and at the same time adding a sentence to clarify that a surf venue, surf basin or stationary wave system is not a D-1 wave action pool.

The proposal then provides new definitions to define a surf venue, surf basin and stationary wave system. These are the terms associated with this rapidly growing facet of the aquatic industry. The surf venue and surf basin definitions are based on industry code and standard work that is currently being worked on. Whereas the stationary wave system definition is based on an approved ASTM

standard.

This proposal moves to Chapter 6 to clarify in Table 604.2 that D-1 turnover requirements do not apply to surf venues, surf basins and stationary wave systems that comply with the newly proposed Section 613. This is to ensure D-1 wave pool turnover requirements are not erroneously applied to these surfing areas and systems.

The new section 613 being proposed then requires that surf venues comply with either two subsections. One subsection requires surf basins to comply with the draft ASTM standard currently being developed and the other subsection requires stationary wave systems to comply with the 2021 edition of the ASTM F3133 Standard for such systems.

This proposal is needed to both ensure these increasingly popular surfing venues and devices are a) not confused with wave action pools and their associated requirements and b) to ensure there are appropriate requirements for surf venues, basins and stationary wave system devices to protect those who utilize them. Simply put, unique surfing venues are currently not appropriately captured in the ISPSC. This proposal is a first step in doing so, recognizing that additional design guidelines will need to be added in the future.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The decrease in cost can range from $40,000 to $2,000,000 per project due to the greater allowance in turnover time by clarifying these products are not wave pools.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost estimate range considers the filtration cost comparing the filter system required for a 2-hour D-1 wave pool turnover rate to a 6 hour turnover rate.

SP30-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:

Class D-1 wave action pool. A pool designed to simulate breaking or cyclic waves for purposes of general play .
It does not include a ~~*surf venue*~~, *surf basin* or *stationary wave system*.

~~**SURF VENUE.**~~

~~A facility designed to accommodate a large body of water dedicated only to surfing on a surfboard or other similar surfing or wave-riding device, with bathymetry, shape, and design that can use a variety of different mechanisms to generate ocean like surfable waves that shoal and break progressively towards shallow water.~~

TABLE 604.2 TURNOVER TIME

CLASS OF POOL	MAXIMUM TURNOVER TIME[a] (hours)
D-1[b]	2
D-2 with less than 24 inches water depth	1
D-2 with 24 inches or greater water depth	2
D-3	1
D-4	2
D-5	1
D-6	1

For SI: 1 inch = 25.4 mm.

a. Pools with a sand bottom require a 1-hour turnover time.

b. ~~Surf venues, s~~ Surf basins, and stationary wave systems in compliance with Section 613 are not considered D-1 pools.

SECTION 613
~~SURF VENUES,~~ SURF BASINS, AND STATIONARY WAVE SYSTEMS

~~613.1 Surf venues.~~
~~Surf venues shall comply with Section 613.1.1 or 613.1.2.~~

Committee Reason: For the modification: Appropriately removes the terms "surf venue" as this is not an industry term.(11-0)
For the proposal as modified: The Committee agreed with the published reason statement. (11-0)

SP30-24

Individual Consideration Agenda

Comment 1:

ISPSC: SECTION 202

Proponents: Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com); Gregory Andrew Ceton, Pool and Hot Tub Alliance (gceton@phta.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Swimming Pool and Spa Code

SURF BASIN.
A constructed body of water with ~~M~~mechanical devices used to generate moving waves that shoal and break toward shallow water with suitable characteristics for surfing and can provide multiple different wave profiles suitable to any level of surfing. A surf basin is only intended to be used for surfing.

Reason: The definition of "surf basin" is expanded and clarified to make it more directly similar to the planned scope of the ASTM standard that provides the technical basis for this new section and to clarify the intended type of facility governed by this new section of the ISPSC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The decrease in cost can range from $40,000 to $2,000,000 per project due to the greater allowance in turnover time by clarifying these products are not wave pools.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost estimate range considers the filtration cost comparing the filter system required for a 2-hour D-1 wave pool turnover rate to a 6 hour turnover rate.

Comment (CAH2)# 679

PSD1-24

IPSDC: CHAPTER 2, SECTION 202, SECTION 202 (New), CHAPTER 13, SECTION 1301, 1301.1, 1301.2, 1301.3 (New), 1301.4 (New), 1301.5 (New), SECTION 1302 (New), 1302.1 (New), 1302.2 (New), 1302.3 (New), 1302.3.1 (New), 1302.3.2 (New), 1302.3.3 (New), 1302.3.4 (New), 1302.3.4.1 (New), 1302.4 (New), 1302.4.1 (New), 1302.4.2 (New), 1302.4.3 (New), 1302.4.4 (New), 1302.4.5 (New), 1302.4.6 (New), 1302.4.7 (New), 1302.4.8 (New), 1302.4.9 (New), 1302.4.10 (New), 1302.4.11 (New), 1302.4.11.1 (New), 1302.4.11.2 (New), 1302.4.11.3 (New), 1302.4.11.4 (New), 1302.4.11.5 (New), 1302.4.11.6 (New), 1302.4.11.7 (New), 1302.5 (New), 1302.5.1 (New), 1302.5.2 (New), 1302.5.3 (New), 1302.6 (New)

Proposed Change as Submitted

Proponents: Mathew Lippincott, University of Michigan, self (mlippin@umich.edu); Martin Hammer, Martin Hammer, Architect (mfhammer@pacbell.net); Pat Lando, Recode (pat@recodenow.org); Ashton Merck, NC State University / STEPS Center, self; Nancy Love, University of Michigan, self; John Lansing, PAE Consulting Engineers (john.lansing@pae-engineers.com); Abraham Noe-Hays, Rich Earth Institute (abe@richearthinstitute.org); Miriam Hacker, Myself; Mark Buehrer, 2020 ENGINEERING, Inc., 2020 ENGINEERING, Inc. (mark@2020engineering.com); Lucas Crane, Arizona State University, self (lccrane1@asu.edu); Hayley Joyell Smith, PHLUSH (Public Hygiene Lets Us Stay Human), PHLUSH, Board Director (hayley@phlush.org); Kim Nace, Brightwater Tools (kim@brightwatertools.com); A P Robertson, self, self (sandyrob51@gmail.com); Treavor Boyer, Arizona State University / STEPS, self (thboyer@asu.edu)

2024 International Private Sewage Disposal Code

CHAPTER 2
DEFINITIONS

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

COMMODE. A fixture without connection to a *sanitary drainage system* used for collecting, containing, or transporting excreta to a *compost processor*. (also dry toilet, urine diverting dry toilet, vacuum flush toilet, foam flush toilet).

COMPOST ADDITIVES. Any material such as sawdust, wood shavings, and other compostable material added to maintain operational conditions within the *composting toilet system*.

COMPOSTING TOILET SYSTEM. A system designed to safely collect and process *excreta* and c*ompost additives* into *humus* through aerobic decomposition.

COMPOST PROCESSOR. The site of aerobic decomposition transforming *excreta* and *compost additives* into *humus*.

DIVERTED URINE. Urine that is collected separately from fecal matter.

EXCRETA. Includes but is not limited to urine, feces, menses, and other human body emissions, as well as toilet paper and biodegradable cleaning products.

HUMUS. The biologically decomposed, soil-like output of the compost processor.

LEACHATE. Liquid drained from a compost processor.

SECONDARY COMPOSTING. Additional retention and continued decomposition of humus removed from compost processors in order to meet the required retention time.

URINE DIVERSION. Collection of *diverted urine* that occurs at the fixture.

URINE DIVERTING COMMODE. A commode that separates urine from other *excreta* and directs urine to a *urine diversion* system that is in accordance with the International Plumbing Code.

Revise as follows:

CHAPTER 13
~~NONLIQUID SATURATED TREATMENT SYSTEMS~~ COMPOSTING TOILET SYSTEMS

SECTION 1301
GENERAL

Revise as follows:

1301.1 Scope. The provisions of this chapter shall govern ~~nonliquid saturated treament systems~~ *composting toilet systems*.

1301.2 ~~Nonliquid saturated treatment systems~~ Maintenance responsibility. ~~The regulations for materials, design, construction and performance shall comply with NSF 41.~~The required maintenance and inspection of *composting toilet systems* shall be the responsibility of the property owner, unless otherwise required by the code official.

Add new text as follows:

1301.3 Operation. *Composting toilet systems* shall be operated and maintained in a safe and sanitary condition in accordance with the Section 1301.4.

1301.4 Operation and maintenance manual. An operation and maintenance manual shall be supplied in hardcopy with all systems. The manual shall be transferred to the new owner or tenant upon transfer of property or tenancy. The manual shall include the following items:

1. Schedule for addition of necessary *compost additives*.
2. Source or provider of necessary *compost additives*. Source may be on-site.
3. Schedule for all regular maintenance tasks.
4. Instructions for all regular maintenance tasks.
5. Expected input of and capacity for *excreta* and *compost additives* to compost toilet system specifying loading of *commode*(s) and *compost processor*(s).
6. Treatment period and expected schedule for removing *humus* from *composting processors* and *secondary composting*, where used.
7. Plan for container transfer and cleaning where transfer is used.
8. Plan for on-site disposal of *humus* or professional removal.
9. Plan for managing *leachate*.
10. For *composting toilet systems* not tested to NSF 41, a plan for microbial testing in accordance with Section 1302.5.2.

1301.5 Approved systems. Composting toilets and *composting toilet systems* shall comply with NSF 41 or shall be in accordance with Section 1302.

SECTION 1302
COMPOSTING TOILET SYSTEM DESIGN

1302.1 Approval. *Composting toilet systems* complying with this section shall be permitted for residential, commercial, and institutional applications.

1302.2 System records. The property owner is responsible for retaining test result records in accordance with the Section 1302.5.2 and making such records available to the *code official* upon request. Upon transfer of property or tenancy, all test records shall be transferred to the owner or tenant, and *humus* shall be re-tested after its first treatment period and a record retained by the property owner.

1302.3 System materials and components. All components expected to contact *excreta* or *leachate* shall be constructed of corrosion-resistant material such as stainless steel or durable polymers. Concrete in contact with *excreta* or *leachate* shall meet requirements of Section 1302.3.3.

1302.3.1 Pipes and fixtures. Pipe, pipe fittings, traps, fixtures, material, and devices used in *composting toilet systems* that are expected to contact *leachate* or *diverted urine* shall be listed by an approved agency or a third-party certification agency in accordance with Section 505 or the International Plumbing Code, unless otherwise approved by the *code official*. Products and materials shall be identified.

1302.3.2 Screening. Where screening is required to prevent the unintentional entry of insects and vermin, screening shall have openings with a maximum size of 3/32 inch (2.5mm). Screening shall be made of materials compatible with the system components in contact with screen materials. Screen materials shall not generate galvanic corrosion of system components.

1302.3.3 Concrete construction. Concrete construction shall be reinforced, watertight, and able to withstand loading in compliance with Section 1302.3.3. Where drainage is required, the *compost processor* floor shall be sloped not less than ¼-inch per foot (20mm per meter), or 2 percent. The flange of each sub-drain shall be set level.

1302.3.4 Commodes. *Commodes* shall be designed to support users of a weight not less than 300 pounds (136 kg). *Commodes* shall transport *excreta* into the *compost processor* or contain *excreta* for transfer as designed and in accordance with the operation and maintenance manual.

1302.3.4.1 Urine diversion. *Urine diversion* piping shall be connected to a *urine diversion* system in accordance with the International Plumbing Code.

1302.4 Compost processors. *Compost processors* shall maintain unsaturated aerobic composting conditions within the compost mass through the drainage, absorption or desiccation of *leachate*; and aeration of the *compost processor*.

1302.4.1 Openings. All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent insect and vermin infiltration and be protected against unauthorized human entry.

1302.4.2 Transfer. Where unfinished *excreta* or *diverted urine* is transferred between *compost processors* or from *commode* to *compost processor*, transfer and cleaning of containers and provisions for limiting user exposure shall be in accordance with the operation and maintenance manual.

1302.4.3 Watertightness. *Compost processors* shall be constructed of watertight material in accordance with Section 1302.3.

1302.4.4 Insects and vermin. *Compost processors* shall be protected to prevent the unintentional entry of insects and vermin. No unsecured opening other than vents, drainage, or *commode* may exceed 1/2 inch (12.7 mm) in the least dimension.

1302.4.5 Sizing. *Compost processors* shall be sized to accommodate the maximum daily adult usage as specified by the manufacturer's or designer's published ratings. *Compost processors* shall be sized to hold at least 10 gallons (38L) of material per person per year while

allowing for the removal of the *humus*.

1302.4.6 Treatment period. The *compost processor* or processors shall be sized to compost *excreta* for a treatment period with a minimum of one year of biologically active conditions. Biologically active conditions shall be maintained at or above a daily average of 42°F (6°C).

Exception: Systems with shorter treatment periods shall be permitted where either:

1. *Humus* from the compost processor has been tested in accordance with Section 1302.5.2 and transferred to *secondary composting* in accordance with Section 1302.4.7.
2. *Humus* is removed off site for processing or disposal at an approved facility.

1302.4.7 Secondary composting. *Humus* transferred to *secondary composting* shall first be tested in accordance with Section 1302.5.2. *Secondary composting* shall be labeled and protected from human contact in a well maintained compost bin or other facility designated for the exclusive purpose of containing *humus* removed from the *compost processor*. Contact with precipitation and surface waters shall be prohibited.

1302.4.8 Venting. Negative pressure between the *commode* and *compost processor* shall be provided where the *compost processor* is connected directly to the *commode* without a trap.

1302.4.9 Vent terminals. Vent stacks shall terminate to the exterior of the building in compliance with the requirements of the International Plumbing Code.

1302.4.10 Leachate. *Leachate* shall be collected for removal or recirculation within the *compost processor*, evaporated or drained to an approved sanitary drainage system or other location approved by the *code official*.

1302.4.11 Leachate storage tanks. *Leachate* storage tanks shall be constructed of corrosion resistant materials.

1302.4.11.1 Venting. *Leachate* storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on leachate storage tanks and shall extend from the top of the tank. Storage tank vents shall be permitted to connect to the plumbing venting system at least 6 inches (150mm) above the flood level rim of the highest fixture. Vents extending to the outdoors shall terminate no less than 12 inches (300mm) above grade. The vent terminal shall be directed downward and covered screening to prevent the unintentional entry of insects and vermin.

1302.4.11.2 Vent size. Pressure equalization vents that prevent nitrogen loss by the use of restrictions, or of piping or tubing that is less than the minimum pipe diameter required by Section 1302.3.1, shall be approved by the *code official*.

1302.4.11.3 Overflow. Where storage tank overflows are installed, they shall be connected to the sanitary drainage system.

1302.4.11.4 Backwater prevention. Storage tank overflows shall be provided with a backwater valve or check valve at any point of connection to a sanitary drainage system or *private sewage disposal system* subject to backflow. The backwater valve shall be accessible for inspections and maintenance.

1302.4.11.5 Above grade. Where subject to freezing conditions, storage tanks shall be provided with an adequate means of freeze protection. Above grade leachate storage tank shall be provided with a high-water sensing device and alarm system. The alarm shall report when 80 percent volume is reached.

1302.4.11.6 Below grade. *Leachate* storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft2) (150 kg/m2) when the tank is designed for underground installation. Below grade *leachate* tanks installed underground shall be provided with

manholes. The manhole opening shall be at least 20 inches (500 mm) in diameter and located at least 4 inches (100 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined hold-down capacity of the tank and hold down system shall meet or exceed the buoyancy force of the tank. Below grade *leachate* storage tank shall be provided with a high-water sensing device and alarm system.

1302.4.11.7 Marking. Where openings are provided to allow a person to enter the tank, the opening shall be marked with the following words: "DANGER—CONFINED SPACE." The letters shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1302.5 Testing. Prior to permit issuance, *composting toilet systems* shall be tested for watertightness in accordance with Section 1302.5.1. Humus from the first treatment period shall be tested after the first treatment period in accordance with Section 1302.5.2.

1302.5.1 Compost processors. *Compost processors* shall be tested for watertightness by filling the system to the maximum designed liquid storage capacity of the unit for a duration of 24 hours.

1302.5.2 Humus. The owner or owner's agent of the *composting toilet system* shall verify compliance with the operation and maintenance manual after the first treatment period and before removal of *humus* from the *compost processor.* A sample of the *humus* from the first treatment period shall be submitted to a certified laboratory. Where multiple *compost processors* are used, the *humus* sample shall be removed from the last *compost processor.* The sample shall be tested in accordance with NSF 41. *Humus* shall not have a moisture content exceeding 75 percent by weight, and the most probable number (MPN) fecal coliform assay shall not exceed 200 MPN per gram (dry weight basis).

1302.5.3 Testing following repairs and alterations. If the *code official* determines that new tests are required following repairs or alterations, tests shall be conducted at the owner's expense and in accordance with Section 1302.5.

1302.6 Humus removal. *Humus* shall be removed in accordance with the operation and maintenance manual. *Humus* from the *compost processor* shall be permitted to be used around ornamental shrubs, flowers, trees, or fruit trees and shall be mixed with soil or mulch and covered with at least 3 inches (76mm) of cover material. Depositing *humus* from any *composting toilet system* around any edible vegetable or vegetation shall be prohibited.

Reason: This proposal offers two paths to composting toilet system approval: either following NSF 41 (as currently provided for in Chapter 13), or with a system inspected and tested to requirements or standards that are as strict or stricter than NSF 41 (through this proposal's new provisions). Integration of the provisions of this proposal into the IPSDC will promote time-tested, safe practices by placing clear requirements for each system component directly into the code. Under the path added by this proposal, each system installation is verified for watertightness, mandated to have a 1-year treatment period to ensure pathogen destruction, tested for proper operation, and required to document and preserve operation and maintenance information. System features that NSF 41 leaves to individual manufacturers or jurisdictions, including venting, screening for insects and vermin, leachate management, and disposal of the outputs of compost processors away from human contact, are subject to clear and enforceable requirements under this proposal.

This proposal is intended to promote the growth of a domestic component supply industry for composting toilet systems that will enable the design of systems appropriate to the scale of the installation. Because NSF 41 treats composting toilet systems as manufactured products rather than systems assembled from a variety of components, the size of composting chambers is limited. For instance, the Bullitt Center in Seattle required multiple Phoenix composting chambers, and load balancing the various chambers created maintenance headaches that were pivotal to removal of the composting toilet system.[1] Under the requirements of this proposal, larger composting chambers could be assembled on-site and tested for watertightness and treatment efficacy, potentially simplifying system design and long-term maintenance. Such site-built composting chambers have become a common feature of large-scale projects in the Netherlands and elsewhere.[2]

Urine diversion can improve the function and reduce the labor and compost additives needed to control odor in a composting toilet system. The use of urine diversion with composting toilets was a core recommendation of the Bullitt Center team. Urine diversion is connected by this proposal's Section 1302.3.4.1 to the IPC and through a parallel Urine Diversion Systems proposal for the IPC. The language in this proposal is based on the Recode Model Code, which incorporates the latest best practices from around the globe. The

Recode Model Code was created in 2015 through a consensus process with a national team of U.S. experts, and was incorporated into IAPMO'S 2017 Water Efficiency and Sanitation Standard (WE Stand), which was revised in 2020 and 2023. The latest Recode Model Code incorporates refinements from the WE Stand process and lessons learned by designers and installers in the interim.

Additionally, a change in the title of Chapter 13 is proposed from "Non-Liquid Saturated Treatment Systems" because that term is not standard in either the industry or its literature, and appears only in NSF 41. The proposed title "Composting Toilet Systems" emphasizes the entire system, rather than a single product, and is a common term used in industry literature and by NSF 41 tested manufacturers such as 'Sun Mar' and 'Advanced Composting Systems'.

(1) *The Bullitt Center Composting Toilet System A White Paper on Lessons Learned*, Bullit Foundation, Seattle, WA, 2021.

(2) Lansing, J. *Designing for Source Separation – the Key to a Regenerative Building*. Rich Earth Summit, Brattleboro, VT, 2023.

Bibliography: 1302.4.6 Treatment period.

One year is approximately twice as long as the survival time of *Ascaris* (Roundworm) eggs under active composting, per Table 6-2 of Biosolids Applied to Land. *Ascaris* are used as an indicator species for long-lived and hard-shelled pathogens.

National Research Council. 2002. *Biosolids Applied to Land*. Washington, DC: The National Academies Press. https://doi.org/10.17226/10426

1302.5.2 Humus.

Bacteriological testing requirements are per NSF 41.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **CT-equipment-cost.pdf**
  https://www.cdpaccess.com/proposal/10314/30802/documentation/147968/attachments/download/4627/

Justification for no cost impact:

Composting toilet systems tested to NSF 41 and those not tested to NSF 41 are comparably priced for similar feature sets and capacities. Under this proposal, systems not tested to NSF 41 will also require a fecal coliform test, which will add $30-60 to those systems; however, the equipment costs will remain comparable.

Composting toilet systems designed for full-time residential use by one to six users and with the most basic dry commode are available in sufficient variety to compare equipment prices of NSF 41 tested systems and those not tested to NSF 41. For NSF 41 tested systems meeting the above criteria, market prices range from $639 to $7700. Systems meeting the same criteria that are not tested to NSF 41 range in price from $1280 to $4745. Please see the attached table for equipment prices as of January 2024.

For engineered systems built on-site and meeting similar criteria, Nutrient Networks estimates system costs of $400 to $6000 before installation.

PSD1-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The language leaves a lot of determinations for compliance up to the code official for which they may not be qualified to make. The scope of the code doesn't cover operation and maintenance. (13-1)

Individual Consideration Agenda

Comment 1:

IPSDC: CHAPTER 13, APPENDIX D (New), (New), SECTION 1301, 1301.1, 1301.2, 1301.3, 1301.4, 1301.5, SECTION 1302, 1302.1, 1302.2, 1302.3, 1302.3.1, 1302.3.2, 1302.3.3, 1302.3.4, 1302.3.4.1, 1302.4, 1302.4.1, 1302.4.2, 1302.4.3, 1302.4.4, 1302.4.5, 1302.4.6, 1302.4.7, 1302.4.8, 1302.4.9, 1302.4.10, 1302.4.11, 1302.4.11.1, 1302.4.11.2, 1302.4.11.3, 1302.4.11.4, 1302.4.11.5, 1302.4.11.6, 1302.4.11.7, 1302.5, 1302.5.1, 1302.5.2, 1302.5.3, 1302.6

Proponents: Mathew Lippincott, University of Michigan, Self (mlippin@umich.edu) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Private Sewage Disposal Code

Delete without substitution:

~~CHAPTER 13~~
~~COMPOSTING TOILET SYSTEMS~~

Add new text as follows:

APPENDIX D
COMPOSTING TOILET SYSTEMS

1301.1 Nonliquid saturated treatment systems. The regulations for materials, design, construction and performance shall comply with NSF 41. **Exception**: *Approved composting toilet systems.*

Revise as follows:

SECTION ~~1301~~ D101
GENERAL

~~1301.1~~ D101.1 Scope. The provisions of this ~~chapter~~appendix shall govern *composting toilet systems*.

~~1301.2~~ D101.2 Maintenance responsibility. The required maintenance and inspection of *composting toilet systems* shall be the responsibility of the property owner, unless otherwise required by the *code official*.

~~1301.3~~ D101.3 Operation. *Composting toilet systems* shall be operated and maintained in a safe and sanitary condition in accordance with the Section ~~13~~D101.4.

~~1301.4~~ D101.4 Operation and maintenance manual. An operation and maintenance manual shall be supplied in hardcopy with all systems. The manual shall be transferred to the new owner or tenant upon transfer of property or tenancy. The manual shall include the following items:

1. Schedule for addition of necessary *compost additives*.
2. Source or provider of necessary *compost additives*. Source may be on-site.

3. Schedule for all regular maintenance tasks.
4. Instructions for all regular maintenance tasks.
5. Expected input of and capacity for *excreta* and *compost additives* to *composting toilet system* specifying loading of *commode*(s) and *compost processor*(s).
6. Treatment period and expected schedule for removing *humus* from *composting processors* and *secondary composting*, where used.
7. Plan for container transfer and cleaning where transfer is used.
8. Plan for on-site disposal of *humus* or professional removal of *humus* in accordance with the authority having jurisdiction.
9. Plan for managing *leachate*.
10. For *composting toilet systems* not tested to NSF 41, a plan for microbial testing in accordance with Section ~~13~~ D102.5.2.

~~1301.5~~ **D101.5 Approved systems.** Composting toilets and *composting toilet systems* shall comply with NSF 41 or shall be in accordance with Section ~~13~~D102.

SECTION ~~1302~~ D102
COMPOSTING TOILET SYSTEM DESIGN

~~1302.1~~ **D102.1 Approval.** Where approved, *c~~C~~omposting toilet systems* complying with this section shall be permitted for residential, commercial, and institutional applications.

~~1302.2~~ **D102.2 System records.** The property owner is responsible for retaining test result records in accordance with the Section ~~13~~D102.5.2 and making such records available to the *code official* upon request. Upon transfer of property or tenancy, all test records shall be transferred to the owner or tenant, and *humus* shall be re-tested after its first treatment period and a record retained by the property owner.

~~1302.3~~ **D102.3 System materials and components.** All components expected to contact *excreta* or *leachate* shall be constructed of corrosion-resistant material such as stainless steel or durable polymers. Concrete in contact with *excreta* or *leachate* shall meet requirements of Section ~~13~~D102.3.3.

~~1302.3.1~~ **D102.3.1 Pipes and fixtures.** Pipe, pipe fittings, traps, fixtures, material, and devices used in *composting toilet systems* that are expected to contact *leachate* or *diverted urine* shall be listed by an approved agency or a third-party certification agency in accordance with Section 505 or the International Plumbing Code, unless otherwise approved by the *code official*. Products and materials shall be identified.

~~1302.3.2~~ **D102.3.2 Screening.** Where screening is required to prevent the unintentional entry of insects and vermin, screening shall have openings with a maximum size of 3/32 inch (2.5mm). Screening shall be made of materials compatible with the system components in contact with screen materials. Screen materials shall not generate galvanic corrosion of system components.

~~1302.3.3~~ **D102.3.3 Concrete construction.** Concrete construction shall be reinforced, watertight, and able to withstand loading in compliance with Section ~~13~~D102.3.3. Where drainage is required, the *compost processor* floor shall be sloped not less than ¼-inch per foot (20mm per meter), or 2 percent. The flange of each sub-drain shall be set level.

~~1302.3.4~~ **D102.3.4 Commodes.** *Commodes* shall be designed to support users of a weight not less than 300 pounds (136 kg). *Commodes* shall transport *excreta* into the *compost processor* or contain *excreta* for transfer as designed and in accordance with the operation and maintenance manual.

~~1302.3.4.1~~ **D102.3.4.1 Urine diversion.** *Urine diversion* piping shall be connected to a *urine diversion* system in accordance with the International Plumbing Code.

~~1302.4~~ **D102.4 Compost processors.** *Compost processors* shall maintain unsaturated aerobic composting conditions within the compost mass through the drainage, absorption or desiccation of *leachate*; and aeration of the *compost processor*.

~~1302.4.1~~ **D102.4.1 Openings.** All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent insect and vermin infiltration and be protected against unauthorized human entry.

~~1302.4.2~~ **D102.4.2 Transfer.** Where unfinished *excreta* or *diverted urine* is transferred between *compost processors* or from *commod*e to *compost processor*, transfer and cleaning of containers and provisions for limiting user exposure shall be in accordance with the operation and maintenance manual.

~~1302.4.3~~ **D102.4.3 Watertightness.** *Compost processors* shall be constructed of watertight material in accordance with Section ~~13~~D102.3.

~~1302.4.4~~ **D102.4.4 Insects and vermin.** *Compost processors* shall be protected to prevent the unintentional entry of insects and vermin. No unsecured opening other than vents, drainage, or *commode* may exceed 1/2 inch (12.7 mm) in the least dimension.

~~1302.4.5~~ **D102.4.5 Sizing.** *Compost processors* shall be sized to accommodate the maximum daily adult usage as specified by the manufacturer's or designer's published ratings. *Compost processors* shall be sized to hold at least 10 gallons (38L) of material per person per year while allowing for the removal of the *humus*.

~~1302.4.6~~ **D102.4.6 Treatment period.** The *compost processor* or processors shall be sized to compost *excreta* for a treatment period with a minimum of one year of biologically active conditions. Biologically active conditions shall be maintained at or above a daily average of 42°F (6°C).

Exception: Systems with shorter treatment periods shall be permitted where either:

1. *Humus* from the compost processor is ~~has been~~ tested in accordance with Section ~~13~~ D102.5.2 and transferred to *secondary composting* in accordance with Section ~~13~~ D102.4.7.
2. *Humus* is removed off site for processing or disposal at an approved facility.

~~1302.4.7~~ **D102.4.7 Secondary composting.** *Humus* transferred to *secondary composting* shall first be tested in accordance with Section ~~13~~D102.5.2. *Secondary composting* shall be labeled and protected from human contact in a well maintained compost bin or other facility designated for the exclusive purpose of containing *humus* removed from the *compost processor*. Contact with precipitation and surface waters shall be prohibited.

~~1302.4.8~~ **D102.4.8 Venting.** Negative pressure between the *commode* and *compost processor* shall be provided where the *compost processor* is connected directly to the *commode* without a trap.

~~1302.4.9~~ **D102.4.9 Vent terminals.** Vent stacks shall terminate to the exterior of the building in compliance with the requirements of the International Plumbing Code.

~~1302.4.10~~ **D102.4.10 Leachate.** *Leachate* shall be collected for removal or recirculation within the *compost processor*, evaporated or drained to an approved sanitary drainage system or other location approved by the *code official*.

~~1302.4.11~~ **D102.4.11 Leachate storage tanks.** *Leachate* storage tanks shall be constructed of corrosion resistant materials.

~~1302.4.11.1~~ **D102.4.11.1 Venting.** *Leachate* storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on leachate storage tanks and shall extend from the top of the tank. Storage tank vents shall be permitted to connect to the plumbing venting system at least 6 inches (150mm) above the flood level rim of the highest fixture. Vents extending to the outdoors shall terminate no less than 12 inches (300mm) above grade. The vent terminal shall be directed downward and covered screening to prevent the unintentional entry of insects and vermin.

~~1302.4.11.2~~ **D102.4.11.2 Vent size.** Pressure equalization vents that prevent nitrogen loss by the use of restrictions, or of piping or tubing

that is less than the minimum pipe diameter required by Section ~~13~~D102.3.1, shall be approved by the *code official.*

~~**1302.4.11.3**~~ **D102.4.11.3 Overflow.** Where storage tank overflows are installed, they shall be connected to the sanitary drainage system.

~~**1302.4.11.4**~~ **D102.4.11.4 Backwater prevention.** Storage tank overflows shall be provided with a backwater valve or check valve at any point of connection to a sanitary drainage system or *private sewage disposal system* subject to backflow. The backwater valve shall be accessible for inspections and maintenance.

~~**1302.4.11.5**~~ **D102.4.11.5 Above grade.** Where subject to freezing conditions, storage tanks shall be provided with an adequate means of freeze protection. Above grade leachate storage tank shall be provided with a high-water sensing device and alarm system. The alarm shall report when 80 percent volume is reached.

~~**1302.4.11.6**~~ **D102.4.11.6 Below grade.** *Leachate* storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft2) (150 kg/m2) when the tank is designed for underground installation. Below grade *leachate* tanks installed underground shall be provided with manholes. The manhole opening shall be at least 20 inches (500 mm) in diameter and located at least 4 inches (100 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined hold-down capacity of the tank and hold down system shall meet or exceed the buoyancy force of the tank. Below grade *leachate* storage tank shall be provided with a high-water sensing device and alarm system.

~~**1302.4.11.7**~~ **D102.4.11.7 Marking.** Where openings are provided to allow a person to enter the tank, the opening shall be marked with the following words: “DANGER—CONFINED SPACE.” The letters shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

~~**1302.5**~~ **D102.5 Testing.** Prior to permit issuance, *composting toilet systems* shall be tested for watertightness in accordance with Section ~~13~~D102.5.1. Humus from the first treatment period shall be tested after the first treatment period in accordance with Section ~~13~~D102.5.2.

~~**1302.5.1**~~ **D102.5.1 Compost processors.** *Compost processors* shall be tested for watertightness by filling the system to the maximum designed liquid storage capacity of the unit for a duration of 24 hours. If the test discloses leaks, the system shall be repaired or altered and shall be reinspected and tested.

~~**1302.5.2**~~ **D102.5.2 Humus.** The owner or owner’s agent of the *composting toilet system* shall verify compliance with the operation and maintenance manual after the first treatment period and before removal of *humus* from the *compost processor*. A sample of the *humus* from the first treatment period shall be submitted to a certified laboratory. Where multiple *compost processors* are used, the *humus* sample shall be removed from the last *compost processor*. The sample shall be tested in accordance with NSF 41. *Humus* shall not have a moisture content exceeding 75 percent by weight, and the most probable number (MPN) fecal coliform assay shall not exceed 200 MPN per gram (dry weight basis).

~~**1302.5.3**~~ **D102.5.3 Testing following repairs and alterations.** If the *code official* determines that new tests are required following repairs or alterations, tests shall be conducted at the owner’s expense and in accordance with Section ~~13~~D102.5.

Delete without substitution:

~~**1302.6 Humus removal.** *Humus* shall be removed in accordance with the operation and maintenance manual. *Humus* from the *compost processor* shall be permitted to be used around ornamental shrubs, flowers, trees, or fruit trees and shall be mixed with soil or mulch and covered with at least 3 inches (76mm) of cover material. Depositing *humus* from any *composting toilet system* around any edible vegetable or vegetation shall be prohibited.~~

Reason: Proposed changes address committee comments and suggestions from testimony. The proposal is now an appendix rather than an addition to Chapter 13. The changes remove several provisions that code officials cannot verify during inspection. Changes also strengthen testing and inspection requirements.The following changes were made to address comments:

- Section 1302.6, Humus removal, could not be inspected and enforced by a code official. Now the proposal simply ensures a removal plan exists (D101.4 Operation and maintenance manual, item 8). This provision mirrors code for approval of holding tanks (805.1, Approval).

- Section D102.1, Approval, now begins with “where approved.”

- Section D102.5, Testing, removes the language about permit issuance.

- Section D102.5.1, Compost processors, now says that any leaks disclosed by the test shall be repaired, reinspected, and tested.

- Section D102.5.3, Testing following repairs and alterations, now mandates testing following repairs or alterations.

The resulting proposal is stronger, more enforceable, and more consistent with other sections of the IPSDC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes correct deficiencies in the original proposal. No changes to the installation, design, or operation are proposed.

Comment (CAH2)# 727

P1-24

IPC: SECTION 202

Proposed Change as Submitted

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

BATHROOM GROUP. A group of fixtures consisting of a water closet, urinal, lavatory, bathtub or shower, including or excluding a bidet, an *emergency floor drain* or both. Such fixtures are located together on the same floor level.

Reason: There doesn't seem to be a technical reason to not include a urinal in a wet vented bathroom group. Currently, the fixture can't be included and is dealt with separately.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Decrease in cost will be realized by not having to plumb the fixture separately .The estimated cost savings for a typical urinal installation is $100 to $250

Estimated Immediate Cost Impact Justification (methodology and variables):

.Material (pipe and fittings) $15 to $100 and the labor is $60 to $120 depending on the salary of the installer.

P1-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: A bathroom group of fixtures is meant to be used by a single occupant. Adding another fixture such as a urinal makes the group a multiple occupant use which could overload the wet vent system.. (14-0)

P1-24

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

BATHROOM GROUP. A group of fixtures consisting of a water closet, ~~urinal,~~ lavatory, bathtub or shower, including or excluding a urinal or bidet, an *emergency floor drain* or both. Such fixtures are located together on the same floor level.

Reason: The committee was concerned of the placement of the word "urinal" so it is relocated to ad it as an option.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Decrease in cost will be realized by not having to plumb the fixture separately. The estimated cost savings for a typical urinsl installation is $100 to $250.

Estimated Immediate Cost Impact Justification (methodology and variables):

Material (pipe and fittings) $15 to $100 and the labor is $60 to $120 depending on the salary of the installer.

Comment (CAH2)# 73

P4-24 Part I

IPC: 305.4

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

305.4 Freezing. Water, soil and waste pipes shall not be installed outside of ~~a~~ the building~~, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both~~ thermal envelope. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

P4-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposed language needs to be improved for clarity. The proponent asked for disapproval. (13-0)

P4-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: 305.4

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

305.4 Freezing. Water, soil and waste pipes shall not be installed outside of the building thermal envelope, unless protected with heat and insulation. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

Comment (CAH2)# 384

P4-24 Part II

IRC: P2603.5

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2603.5 Freezing. In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2 of this code, a water, soil or waste pipe shall not be installed outside of ~~a~~ the *building*~~, in exterior walls, in *attics* or *crawl spaces*, or in any other place subjected to freezing temperature unless adequate provision is made to protect it from freezing by insulation or heat or both~~ thermal envelope. Water service pipe shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

P4-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal is overly restrictive for where piping can be located to prevent freezing. (10-0)

P4-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: P2603.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

P2603.5 Freezing. In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2 of this code, a water, soil or waste pipe shall not be installed outside of the *building* thermal envelope, unless protected with heat and insulation. Exterior ~~W~~water ~~service~~ supply system ~~pipe~~ piping shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

Comment (CAH2)# 389

P7-24

IPC: 306.2.4

Proposed Change as Submitted

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

306.2.4 Tracer wire. For plastic sewer piping, an insulated copper tracer wire or other *approved* conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the *building drain* and *building sewer*. The tracer wire size shall be not less than ~~14~~ 18 American Wire Gauge (2.5 mm^2), shall be green in color and the insulation type shall be listed for direct burial.

Reason: Its overkill to require a 14-gauge wire when a 18 gauge wire will do the same job and is less expensive. This is consistent with what's required in the IFGC. The American Public Works Association provides color guidance for sewer pipe including blue for potable water and yellow for gas.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This will decrease the cost of construction requiring a smaller gauge wire that is less expensive than a 14 gauge wire. "The cost savings is $15 for 100 feet of tracer wire..

Estimated Immediate Cost Impact Justification (methodology and variables):

.
There is not a difference in labor to install. The current price of 18 gauge wire is $0.09 per foot and for 14 gauge wire, $0.11 per foot.

P7-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There has been no testing to show that the smaller wire has the necessary durability for the application. The green color could be hard to find in grass cover. (10-4)

P7-24

Individual Consideration Agenda

Comment 1:

IPC: 306.2.4

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

306.2.4 Tracer wire. For plastic sewer piping, an insulated copper tracer wire or other *approved* conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the *building drain* and *building sewer*. The tracer wire size shall be not less than 18 American Wire Gauge (~~2.5~~ 1.02 mm^2), shall be green in color and the insulation type shall be listed for direct burial.

Reason:

- No testing is needed as the wire is required to be rated for direct burial.
- The color green will not be an issue because both ends of the wire terminate at the cleanout where it can be energized, The wire stars at the cleanout, follows the pipe to its end point and is turned around and follows the pipe back to the cleanout location. There was misunderstanding as how the wire was to be installed. The cleanout will be obvious to locate and the wire will be quite visible, regardless of weeds or grass, The color green is from a nations standard.
- Changing the the gauge will align with the IFGC.
- The correct metric should be an editorial addition. by staff.
- A spool of 18 gauge will cost less than a spool of14 gauge wire obviously.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost will decrease will depend on how the wire is purchased.

Estimated Immediate Cost Impact Justification (methodology and variables):

A spool of 18 gauge wire will cost less than a spool of 14 gauge due ti being a thicker wire.

Comment (CAH2)# 119

P10-24

IPC: SECTION 202 (New), 308.7, 308.7.1

Proposed Change as Submitted

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org)

2024 International Plumbing Code

Add new definition as follows:

JOINT RESTRAINT. A restraint assembly to resist axial movement at a joint in a piping system.

Revise as follows:

308.7 ~~Anchorage~~ Joint restraint. ~~Anchorage~~ Joint restraint shall be provided to restrain drainage piping from axial movement.

308.7.1 Location. For ~~pipe sizes~~ *horizontal pipes* 4 inches (102 mm) and larger that convey drainage ~~greater than 4 inches (102 mm),~~ joint restraints shall be provided ~~for drain pipes~~ at all changes in direction. ~~and~~ Joint restraints shall be provided for *horizontal pipes* 4 inches (102 mm) and larger that convey drainage at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.

Reason: There has been a great deal of confusion between sway bracing, joint restraint, and the current code term “anchorage.” This proposal replaces the current term anchorage and replaces it with what the code is prescribing, which is joint restraint. This proposal provides a clear distinction for the users of the code as well as what is required of each. These items are specifically for drainage piping systems and the current proposal is reflective of that fact. Additionally, the language has been made consistent with related section 308.6, utilizing the language “*horizontal pipes* that convey drainage” The addition of further clarification as to change of direction as well as separating and clarifying the two distinct applications of joint restraint locations has been made. This clarifies the distinction between the two items and the requirements to accomplish each to the code official, installer, and other users of this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is is a clarification and has no cost impact on the cost of construction.

P10-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal changes from "greater than 4 inch" to "4 inch and greater". This doesn't agree with cast iron piping installation instructions. (14-0)

P10-24

Individual Consideration Agenda

Comment 1:

IPC: 308.8 (New), 308.1 (New)

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Add new text as follows:

308.8 Anchorage. Anchorage shall be provided to restrain drainage piping from axial movement.

308.1 Location. For pipe sizes greater than 4 inches (102 mm), restraint shall be provided for drain pipes at all changes in direction.

Reason: There has been a great deal of confusion between sway bracing, joint restraint, and anchorage. This proposal relocates the current term anchorage and section 308.7 and 308.7.1 it with what the code is prescribing, which is joint restraint. This proposal provides a clear distinction for the users of the code as well as what is required of each. These items are specifically for drainage piping systems and the current proposal is reflective of that fact. The addition of further clarification as to change of direction as well as separating and clarifying the two distinct applications of joint restraint locations has been made. This clarifies the distinction between the items and the requirements to accomplish each to the code official, installer, and other users of this code. This modification is to satisfy the request of the committee to retain anchorage in the code as well as correct the pipe size of these items to maintain current code requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no additional cost of construction with being editorial in nature.

Comment (CAH2)# 548

P19-24 Part I

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART III WILL BE HEARD BY THE ISPSC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Coliseums, arenas, skating rinks~~, pools~~ and tennis courts for indoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400	1 per 400	1 per 300	-	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

2024 International Building Code

Revise as follows:

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400	1 per 400	1 per 300	-	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

Reason: Background

The *2024 International Swimming Pool and Spa Code* does not have any restroom fixture requirements for class A, B, or C pools. For Class D pools, the fixture count is deferred to the *2024 International Plumbing Code*. But that code does not divide pools by class, and requires a large number of plumbing fixtures for indoor pools, but none for outdoor pools. The number of plumbing fixtures is an important public health concern as bathrooms being too far away or long lines for the bathroom will encourage some people to urinate in the pool. This is true regardless of the class of the pool and regardless of its location indoors and outdoors. That said, the number of fixtures required for indoor pools has been found to be excessive. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. Therefore we have an obvious need to reduce the fixture requirement for indoor pools, but apply the same requirement for outdoor pools, and make the requirements cover all pools according to their class.

Occupant loads assigned under existing codes

In the *2024 International Building Code*, the current occupant load factors for pools are 50 gross in the pool and 15 gross on the deck. We have found that both requirements are unrealistic for most pools today. Pools today are shallower, many have no deep end at all. As a result, people comfortably congregate in them more closely than they used to. When the deck area and pool area are equal, these factors are equivalent to ignoring the deck area and assigning one user per 12 square feet of water, or assigning one user per 24 square feet of deck and water surface area per occupant.

The *2024 International Swimming Pool and Spa Code* recommends that a *bather load* (this is not the same thing as *occupant load*) be assigned based on various factors that vary from 20 gross to 8 gross. Confusingly, the load factors get smaller as the deck area gets bigger. The result is that the *bather load* stops increasing with deck area once the deck area is equal to twice the pool area. In this case, the maximum bather load is 8 square feet of water surface area per bather, or, equivalently, 24 square feet of deck and water surface per bather. When the deck area is equal to the water surface area, again the math comes out to 24 square feet of deck and water surface area per bather.

For Class D pools only, the *2024 ISPSC* does assign an occupant load. It requires a much larger load, with the load factor varying from 10 gross to 8 gross, this time with deck area considered at 15 gross (this changed in 2015 to harmonize it with IBC Table 1004.5. Previously it was 50 gross). These occupant loads are aggressively larger, but only if the jurisdiction has adopted the *ISPSC.* This increased load might be reasonable for heavily used wave pools and leisure rivers, but other Class D pools can only be used by a few users at a time, for instance floating lily pad walks, climbing walls, water slides, etc, so that increase does not make much sense in these cases.

The *Model Aquatic Health Code* assigns occupant load factors ranging from 10 to 20 square feet for water surface area, but only one occupant per 50 square feet on the deck. This is roughly a mirror image of the current *International Building Code.*

Justification of changes occupant loads in IBC Table 1004.5 and ISPSC 608.1

· **Swimming pool areas with water depth exceeding 5 ft** – users do not lounge or congregate in these areas because keeping one's head above water requires constant effort. They are doing activities such as lap swimming, diving, synchronized swimming, and water polo. The highest density of these activities is water polo, with a pool area as small as 20 meters by 10 meters being used by two teams of seven players each. The result is one occupant per 150 square feet.

· **Spa areas –** The *Model Aquatic Health Code* and *Florida Building Code* both assign 1 occupant or bather per 10 square feet. It would not be conservative for the *International Building Code* to ignore this guidance.

· **Catch pools –** The slides are supervised and people are not permitted to go down the slide unless the area is clear.

· **All other swimming pool areas and decks –** Currently these areas are treated very differently. We have observed users congregating in pools tighter than one per 50 square feet. As for the deck, it is reasonable to think that people congregate in deck areas similar to unconcentrated assembly seating or airport terminal waiting areas (which both get a load factor of 15), however, most of these people "reserve" a movable chair for themselves with a towel or purse and then proceed to the pool. Increasing this factor to 24 accounts for the fact that some people stay in this area, but most reserve a space in the area before moving on to another area. Assigning the same factor to both areas is logical when you consider the increased number of tanning ledges that are being installed recently. Such areas are basically used the same as deck, mainly used by people standing or in lounge chairs, yet the load factor is different. The load factor should be the same.

· **Class D-1, D-4, and D-6 pool deep areas –** These bodies of water do not tend to have deep areas, and even when they do, ropes are placed to discourage users from using them. The occupant load factors for shallow areas and decks have been left alone so that the egress requirements for these types of pools will not change. However, in past versions of the code the Class D minimum fixture count was not based on this very high number of occupants. In the 2018 code, a Leisure River with 7500 square feet of water and 7500 square feet of deck would have 1,438 occupants but only require 2 water closets for females. We are proposing that the occupant count would remain 1,438, but that number brought to the proposed revision of Table 2902 computes to 7 water closets for females. That is roughly similar to what the current code would call for on an indoor class A, B, or C pool, and that is too high. So this proposal adds a clause to Section 608 of the *ISPSC* that Table 608 should not be used for fixture count, rather Table 1004.5 of the *IBC* should be used. This way changing a pool from Class C to Class D will have no impact on the minimum fixture count, but it would have an impact on egress and other occupant count related items. The minimum fixture count for the Leisure River mentioned above would be 4 water closets for females.

· **Other Class D pools –** This includes catch pools, activity pools, and vortex pools. These pools are meant to be used by distinct groups of supervised users one at a time. Letting them default back to one occupant per 24 square feet rather than one per 8 square feet is still conservative.

Summary of changes occupant loads resulting from this proposal

The changes to 1004.5 under this proposed change would give:

Class A, B, or C Pool, 5' deep or less, with

deck area *less than* pool area

Slightly *more* occupants

deck area *equal* to pool area

The *same* number occupants

deck area *more than* pool area

Slightly *fewer* occupants

Catch Pools

~ 100x *fewer* occupants

Wave Pools, Leisure Rivers, Interactive Water Features, 5’ deep or less

The *same* (very large) number of occupants

Activity Pools, Vortex Pools, Pool areas greater than 5’ deep

3x *fewer* occupants

Spa Pools

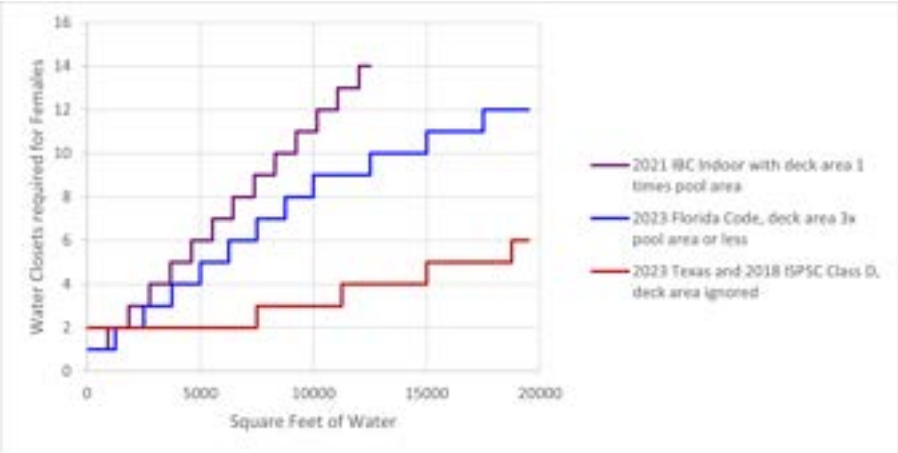
5x *more* occupants

Minimum Fixture Count in 2018 I-codes

The *International Swimming Pool and Spa Code 2018* assigned a minimum fixture count to all Class D pools. This fixture count overruled Table 2902 in the *IBC.* In this code year, the result was a Class D pool would be assigned many more occupants than a Class A, B, or C pool. But if it was indoors, it would be assigned many fewer minimum restroom fixtures than a similar Class A, B, or C pool. If it was outdoors, it would be assigned the same small number of fixtures, even though a Class A, B, or C pool would not have any minimum number of fixtures. In the 2021 code cycle, section 609 of the *International Swimming Pool and Spa Code* was truncated, leaving only a minimum number of showers, not of toilets or lavatories, for outdoor pools and Class D pools.

Minimum Fixture Count in current codes

The *International Building Code* assigns fixtures to occupants, of indoor pools, and assigns occupants both to the deck area and the pool water area. No fixtures are assigned to occupants of outdoor pools. In effect, fixtures are assigned both to areas of the deck and areas of the pool. The other state-level codes surveyed in this effort are for Florida and Texas. In Texas, the deck area is ignored entirely. In Florida, it is ignored for all deck area less than 3x of the pool area, which practically includes all pool decks. But in the current *IBC,* for indoor pools only, the deck area becomes a much more important factor than the pool area. The number of fixtures required by this code is already significantly more than Florida would require even when the deck is only 1x of the pool area. The reason is because the occupants of a pool and pool deck are treated the same as the occupants of a stadium or arena in terms of their need to use the bathroom. Meanwhile Texas, ignoring the pool area, their code gives a result that is much lower for the same pool. But Texas didn’t make this up, rather, their table comes from section 609 of the 2018 ISPSC.



Justification of new row in IBC Table 2902.1

The intent of adding a new row, rather than using the existing rows for coliseums and arenas, is to reduce the number of fixtures required. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. The calculation results in the new orange lines shown in the graph below, with the existing codes still shown for reference. The new code proposal will agree closely with the Florida Code when the deck is 3x the pool area, and agree closely with the Texas code when only minimal deck is provided.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

For indoor pools and Class D pools plumbing fixture requirement will be about the same. Indoor pool plumbing fixture requirements will be reduced. Outdoor pool plumbing fixture requirements will be increased. Overall, the number of plumbing fixtures will be slightly decreased.

P19-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee is favor of the proposal but the proposal needs modified to add an entry for number of required showers. (9-5)

P19-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: TABLE 403.1; IBC: [P] TABLE 2902.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMAL			
1	Assembly	Coliseums, arenas, skating rinks and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400	1 per 400	1 per 300	1 shower per 300 males / 1 shower per 300 females	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

2024 International Building Code

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities [f]	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400	1 per 400	1 per 300	1 shower per 300 males/1 shower per 300 females	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities [f]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

Reason: When addressing cleansing showers, the ISPSC sends the user to the IPC and IBC Tables. However, we were remiss in putting the number of showers required and this comment rectifies that by adding in the shower/bathtub column the number required, as “1 per 300 female and 1 per 300 male.”

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This comment does not increase the cost of construction as the original proposal's cost impact already accounted for the costs.

Comment (CAH2)# 170

NOTE: P19-24 PART II DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

P19-24 Part II

IBC: TABLE 1004.5, 1004.9 (New); IFC: [BE] TABLE 1004.5, 1004.9 (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	

Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools . The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	
Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools. The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

Reason: Background

The *2024 International Swimming Pool and Spa Code* does not have any restroom fixture requirements for class A, B, or C pools. For Class D pools, the fixture count is deferred to the *2024 International Plumbing Code.* But that code does not divide pools by class, and requires a large number of plumbing fixtures for indoor pools, but none for outdoor pools. The number of plumbing fixtures is an important public health concern as bathrooms being too far away or long lines for the bathroom will encourage some people to urinate in the pool. This is true regardless of the class of the pool and regardless of its location indoors and outdoors. That said, the number of fixtures required for indoor pools has been found to be excessive. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. Therefore we have an obvious need to reduce the fixture requirement for indoor pools, but apply the same requirement for outdoor pools, and make the requirements cover all pools according to their class.

Occupant loads assigned under existing codes

In the *2024 International Building Code*, the current occupant load factors for pools are 50 gross in the pool and 15 gross on the deck. We have found that both requirements are unrealistic for most pools today. Pools today are shallower, many have no deep end at all. As a result, people comfortably congregate in them more closely than they used to. When the deck area and pool area are equal, these factors are equivalent to ignoring the deck area and assigning one user per 12 square feet of water, or assigning one user per 24 square feet of deck and water surface area per occupant.

The *2024 International Swimming Pool and Spa Code* recommends that a *bather load* (this is not the same thing as *occupant load*) be assigned based on various factors that vary from 20 gross to 8 gross. Confusingly, the load factors get smaller as the deck area gets bigger. The result is that the *bather load* stops increasing with deck area once the deck area is equal to twice the pool area. In this case, the maximum bather load is 8 square feet of water surface area per bather, or, equivalently, 24 square feet of deck and water surface per bather. When the deck area is equal to the water surface area, again the math comes out to 24 square feet of deck and water surface area per bather.

For Class D pools only, the *2024 ISPSC* does assign an occupant load. It requires a much larger load, with the load factor varying from 10 gross to 8 gross, this time with deck area considered at 15 gross (this changed in 2015 to harmonize it with IBC Table 1004.5. Previously it was 50 gross). These occupant loads are aggressively larger, but only if the jurisdiction has adopted the *ISPSC.* This increased load might be reasonable for heavily used wave pools and leisure rivers, but other Class D pools can only be used by a few users at a time, for instance floating lily pad walks, climbing walls, water slides, etc, so that increase does not make much sense in these cases.

The *Model Aquatic Health Code* assigns occupant load factors ranging from 10 to 20 square feet for water surface area, but only one occupant per 50 square feet on the deck. This is roughly a mirror image of the current *International Building Code.*

Justification of changes occupant loads in IBC Table 1004.5 and ISPSC 608.1

· **Swimming pool areas with water depth exceeding 5 ft** – users do not lounge or congregate in these areas because keeping one's head above water requires constant effort. They are doing activities such as lap swimming, diving, synchronized swimming, and water polo. The highest density of these activities is water polo, with a pool area as small as 20 meters by 10 meters being used by two teams of seven players each. The result is one occupant per 150 square feet.

· **Spa areas –** The *Model Aquatic Health Code* and *Florida Building Code* both assign 1 occupant or bather per 10 square feet. It would not be conservative for the *International Building Code* to ignore this guidance.

· **Catch pools –** The slides are supervised and people are not permitted to go down the slide unless the area is clear.

· **All other swimming pool areas and decks –** Currently these areas are treated very differently. We have observed users congregating in pools tighter than one per 50 square feet. As for the deck, it is reasonable to think that people congregate in deck areas similar to unconcentrated assembly seating or airport terminal waiting areas (which both get a load factor of 15), however, most of these people "reserve" a movable chair for themselves with a towel or purse and then proceed to the pool. Increasing this factor to 24 accounts for the fact that some people stay in this area, but most reserve a space in the area before moving on to another area. Assigning the same factor to both areas is logical when you consider the increased number of tanning ledges that are being installed recently. Such areas are basically used the same as deck, mainly used by people standing or in lounge chairs, yet the load factor is different. The load factor should be the same.

· **Class D-1, D-4, and D-6 pool deep areas –** These bodies of water do not tend to have deep areas, and even when they do, ropes are placed to discourage users from using them. The occupant load factors for shallow areas and decks have been left alone so that the egress requirements for these types of pools will not change. However, in past versions of the code the Class D minimum fixture count was not based on this very high number of occupants. In the 2018 code, a Leisure River with 7500 square feet of water and 7500 square feet of deck would have 1,438 occupants but only require 2 water closets for females. We are proposing that the occupant count would remain 1,438, but that number brought to the proposed revision of Table 2902 computes to 7 water closets for females. That is roughly similar to what the current code would call for on an indoor class A, B, or C pool, and that is too high. So this proposal adds a clause to Section 608 of the *ISPSC* that Table 608 should not be used for fixture count, rather Table 1004.5 of the *IBC* should be used. This way changing a pool from Class C to Class D will have no impact on the minimum fixture count, but it would have an impact on egress and other occupant count related items. The minimum fixture count for the Leisure River mentioned above would be 4 water closets for females.

· **Other Class D pools –** This includes catch pools, activity pools, and vortex pools. These pools are meant to be used by distinct groups of supervised users one at a time. Letting them default back to one occupant per 24 square feet rather than one per 8 square feet is still conservative.

Summary of changes occupant loads resulting from this proposal

The changes to 1004.5 under this proposed change would give:

Class A, B, or C Pool, 5' deep or less, with

deck area *less than* pool area

Slightly *more* occupants

deck area *equal* to pool area

The *same* number occupants

deck area *more than* pool area

Slightly *fewer* occupants

Catch Pools

~ 100x *fewer* occupants

Wave Pools, Leisure Rivers, Interactive Water Features, 5’ deep or less

The *same* (very large) number of occupants

Activity Pools, Vortex Pools, Pool areas greater than 5’ deep

3x *fewer* occupants

Spa Pools

5x *more* occupants

Minimum Fixture Count in 2018 I-codes

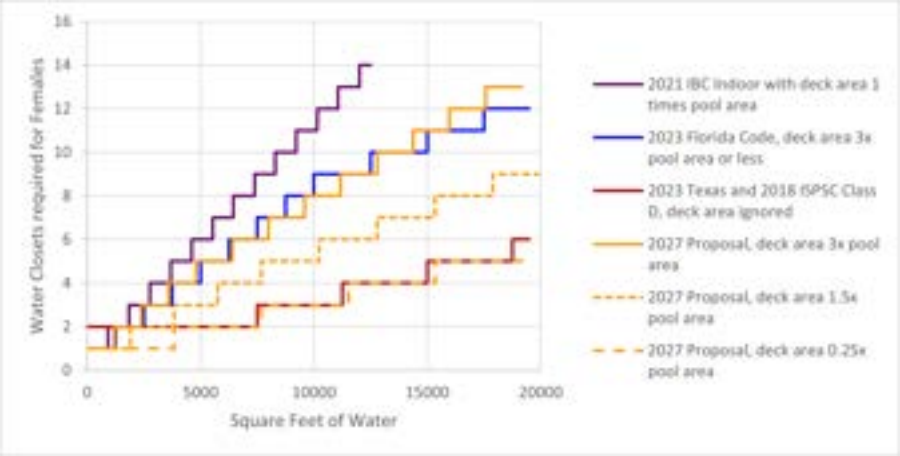
The *International Swimming Pool and Spa Code 2018* assigned a minimum fixture count to all Class D pools. This fixture count overruled Table 2902 in the *IBC.* In this code year, the result was a Class D pool would be assigned many more occupants than a Class A, B, or C pool. But if it was indoors, it would be assigned many fewer minimum restroom fixtures than a similar Class A, B, or C pool. If it was outdoors, it would be assigned the same small number of fixtures, even though a Class A, B, or C pool would not have any minimum number of fixtures. In the 2021 code cycle, section 609 of the *International Swimming Pool and Spa Code* was truncated, leaving only a minimum number of showers, not of toilets or lavatories, for outdoor pools and Class D pools.

Minimum Fixture Count in current codes

The *International Building Code* assigns fixtures to occupants, of indoor pools, and assigns occupants both to the deck area and the pool water area. No fixtures are assigned to occupants of outdoor pools. In effect, fixtures are assigned both to areas of the deck and areas of the pool. The other state-level codes surveyed in this effort are for Florida and Texas. In Texas, the deck area is ignored entirely. In Florida, it is ignored for all deck area less than 3x of the pool area, which practically includes all pool decks. But in the current *IBC,* for indoor pools only, the deck area becomes a much more important factor than the pool area. The number of fixtures required by this code is already significantly more than Florida would require even when the deck is only 1x of the pool area. The reason is because the occupants of a pool and pool deck are treated the same as the occupants of a stadium or arena in terms of their need to use the bathroom. Meanwhile Texas, ignoring the pool area, their code gives a result that is much lower for the same pool. But Texas didn’t make this up, rather, their table comes from section 609 of the 2018 ISPSC.

Justification of new row in IBC Table 2902.1

The intent of adding a new row, rather than using the existing rows for coliseums and arenas, is to reduce the number of fixtures required. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. The calculation results in the new orange lines shown in the graph below, with the existing codes still shown for reference. The new code proposal will agree closely with the Florida Code when the deck is 3x the pool area, and agree closely with the Texas code when only minimal deck is provided.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

For indoor pools and Class D pools plumbing fixture requirement will be about the same. Indoor pool plumbing fixture requirements will be reduced. Outdoor pool plumbing fixture requirements will be increased. Overall, the number of plumbing fixtures will be slightly decreased.

P19-24 Part II

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The calculation of occupant load by pool type will improve accuracy for determining egress for these types of facilities. (Vote: 13-0)

P19-24 Part II

P19-24 Part III

ISPSC: SECTION 202 (New), 202 (New), SECTION 321 (New), 321.1 (New), 321.2 (New), 321.2.1 (New), 321.2.1.1 (New), 321.2.1.2 (New), 321.3 (New), 321.3.1 (New), 321.4 (New), 321.4.1 (New), 321.4.2 (New), 321.5 (New), 321,6 (New), 321.7 (New), 321.8 (New), 321.9 (New), SECTION 410, 410.1, SECTION 608, 608.1, TABLE 608.1, 608.2, SECTION 609, 609.1, 609.2, 609.2.1, 609.2.2, 609.3, 609.3.1, 609.3.2, 609.3.3, 609.4, 609.4.1, 609.4.2, 609.5, 609.6, 609.7, 609.8, 609.9

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Add new definition as follows:

SHOWER. A device that sprays water on the body.

Cleansing. A shower located within a hygiene facility using warm water and soap. The purpose of showers is to remove contaminants including perianal fecal material, sweat, skin cells, personal care products, and dirt before bathers enter the aquatic venue.

Rinse. A shower typically located in the pool deck area with ambient temperature water. The main purpose is to remove dirt, sand, or organic material prior to entering the aquatic venue to reduce the introduction of contaminants and the formation of disinfection byproduct.

Add new text as follows:

SECTION 321
DRESSING AND SANITARY FACILITIES

321.1 General. Dressing and sanitary facilities for public pools, public spas and aquatic recreation facilities shall be provided in accordance with the minimum requirements of the *International Building Code*, the *International Plumbing Code* and Sections 321.2 through 321.9. These facilities shall be located within a 300 foot path of travel from the pool area.

321.2 Number of fixtures. The minimum number of required water closets, urinals, lavatories, and drinking fountains fixtures shall be provided in accordance with the minimum requirements of the *International Building Code* and the *International Plumbing Code*.
Exception: For Class C swimming pools, fixtures dedicated to the pool area shall not be required where all dwelling units meet all of the following requirements:

1. The dwelling units have private facilities.
2. The dwelling units are within a 300 feet path of travel from the pool area.
3. The dwelling units are not more than one story above or below the pool area.

For Class C swimming pools where some but not all dwelling units meet the requirements of this exception, the minimum occupant load used to calculate the minimum fixture requirements shall be reduced by a factor equal to the number of dwelling units meeting these requirements, divided by the total number of dwelling units served by the pools.

321.2.1 Dressing facilties and rinsing showers. Dressing facilities and the number of rinse showers shall be provided in accordance with Sections 321.2.1.1 and 321.2.1.2.

321.2.1.1 Dressing Facilities. Public pools, public spas and aquatic recreation facilities shall have dressing facilities.
Exception: This section shall not apply to Class C pools.

321.2.1.2 Rinse shower. In addition to the requirement for cleansing showers in the International Plumbing Code and International Building Code, not less than one rinse shower shall be provided on the deck of, or at the entrance of, each pool.

321.3 Water heater and mixing valve. Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.

321.3.1 Temperature. At each cleansing showerhead, hot or tempered water shall be provided as required by the *International Plumbing Code*. **Exception:** Water supplied to rinse showers shall not be required to be heated

321.4 Soap dispensers. . Soap dispensers shall be in accordance with Sections 329.4.1 and 329.4.2.

321.4.1 Liquid or powdered soap. Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap shall be prohibited. Soap dispensers and soap shall not be provided at rinse showers.

321.4.2 Metal or plastic dispenser. Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.

321.5 Toilet tissue holder. A toilet tissue holder shall be provided at each water closet

321,6 Mirrors. Where provided, mirrors shall be shatter resistant

321.7 Sanitary napkin receptacles. Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.

321.8 Sanitary napkin dispensers. A sanitary napkin dispenser shall be provided in each toilet facility for females.

321.9 Infant care. Baby-changing tables shall be provided in toilet facilities

SECTION 410
SANITARY FACILITIES

Revise as follows:

410.1 ~~Toilet facilities~~ General. ~~Class A and B pools~~ Public pools and public spas shall be provided with ~~toilet facilities~~ dressing and sanitary facilities ~~having the required number of plumbing fixtures~~ in accordance with Section 321.~~the *International Building Code* or the *International Plumbing Code*.~~

SECTION 608
NUMBER OF OCCUPANTS

Revise as follows:

608.1 Occupant load. The occupant load for the Class D-1, D-4, and D-6 pools ~~or spas~~ in the facility shall be calculated in accordance with Table 608.1~~.~~ , however the occupant load used for the minimum fixture count shall be calculated in accordance with Table 1004.5 of the International Building Code. The occupant load for all other pools shall be calculated in accordance with Table 1004.5 of the International Building Code.

~~The occupant load shall be the combined total of the number of users based on the pool or spa water surface area and the deck area surrounding the pool or spa. The deck area occupant load shall be based on the occupant load calculated where a deck is provided or based on an assumed 4-foot-wide (1219 mm) deck surrounding the entire perimeter of the pool or spa, whichever is greater.~~

TABLE 608.1 INCREASED OCCUPANT LOAD FOR CLASS D-1, D-4, AND D-6 POOLS

SHALLOW OR WADING ZERO DEPTH AREAS	DEEP AREA ~~(NOT INCLUDING THE DIVING AREA)~~	~~DIVING AREA (PER EACH DIVING BOARD)~~	DRY DECK AREA	
Vessel water surface area	8 sq. ft per user	~~10 sq. ft. per user~~	300 sq. ft. per user	—
Deck area	—	—	—	1 user per 15 sq. ft.

For SI: 1 square foot = 0.0929 m^2.

Delete without substitution:

~~**608.2 Facility capacity.** For multiple pools and spas in a single aquatic recreation facility, the total facility occupant capacity shall not be limited by the number of occupants calculated in accordance with Section 608.1.~~

SECTION 609
DRESSING AND SANITARY FACILITIES

Revise as follows:

609.1 General. Dressing and sanitary facilities shall be provided in accordance with the minimum requirements of Section 321. ~~the *International Building Code* and *International Plumbing Code* and Sections 609.2 through 609.9.~~

Delete without substitution:

~~**609.2 Number of fixtures.** The minimum number of required water closets, urinals, lavatory, and drinking fountain fixtures shall be provided as required by the *International Building Code* and *International Plumbing Code* and the dressing facilities and number of cleansing and rinse showers shall be provided in accordance with Sections 609.2.1, 609.2.2, and 609.3.1.~~

~~**609.2.1 Water area less than 7500 square feet.** Facilities that have less than 7500 gross square feet (697 m^2) of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males and one cleansing shower for females.~~

~~**Exception:** This requirement shall not apply to Class C semipublic pools.~~

~~**609.2.2 Water area 7500 square feet or more.** Facilities that have 7500 gross square feet (697 m^2) or more of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males, and one cleansing shower for females for every 7500 square feet (697 m^2) or portion thereof. Where the result of the fixture calculation is a portion of a whole number, the result shall be rounded up to the nearest whole number.~~

~~**609.3 Showers.** Showers shall be in accordance with Sections 609.3.1 through 609.3.3.~~

~~**609.3.1 Rinse shower.** In addition to the requirement for cleansing showers in Sections 609.2.1 and 609.2.2, not less than one rinse showershall be provided on the deck of or at the entrance of each pool.~~

~~**609.3.2 Water heater and mixing valve.** Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.~~

~~**609.3.3 Temperature.** At each cleansing showerhead, the heated shower water temperature shall be not less than 90°F (32°C) and not greater than 120°F (49°C). Water supplied to rinse showers shall not be required to be heated.~~

~~**609.4 Soap dispensers.** Soap dispensers shall be in accordance with Sections 609.4.1 and 609.4.2.~~

~~**609.4.1 Liquid or powder.** Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap is prohibited. Soap dispensers and soap shall not be provided at rinse showers.~~

~~**609.4.2 Metal or plastic.** Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.~~

~~**609.5 Toilet tissue holder.** A toilet paper holder shall be provided at each water closet.~~

~~**609.6 Lavatory mirror.** Where mirrors are provided, they shall be shatter resistant.~~

~~**609.7 Sanitary napkin receptacles.** Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.~~

~~**609.8 Sanitary napkin dispensers.** A sanitary napkin dispenser shall be provided in each toilet facility for females.~~

~~**609.9 Infant care.** Baby changing tables shall be provided in toilet facilities having two or more water closets.~~

Reason: Background

The *2024 International Swimming Pool and Spa Code* does not have any restroom fixture requirements for class A, B, or C pools. For Class D pools, the fixture count is deferred to the *2024 International Plumbing Code.* But that code does not divide pools by class, and requires a large number of plumbing fixtures for indoor pools, but none for outdoor pools. The number of plumbing fixtures is an important public health concern as bathrooms being too far away or long lines for the bathroom will encourage some people to urinate in the pool. This is true regardless of the class of the pool and regardless of its location indoors and outdoors. That said, the number of fixtures required for indoor pools has been found to be excessive. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. Therefore we have an obvious need to reduce the fixture requirement for indoor pools, but apply the same requirement for outdoor pools, and make the requirements cover all pools according to their class.

Occupant loads assigned under existing codes

In the *2024 International Building Code*, the current occupant load factors for pools are 50 gross in the pool and 15 gross on the deck. We have found that both requirements are unrealistic for most pools today. Pools today are shallower, many have no deep end at all. As a result, people comfortably congregate in them more closely than they used to. When the deck area and pool area are equal, these factors are equivalent to ignoring the deck area and assigning one user per 12 square feet of water, or assigning one user per 24 square feet of deck and water surface area per occupant.

The *2024 International Swimming Pool and Spa Code* recommends that a *bather load* (this is not the same thing as *occupant load*) be assigned based on various factors that vary from 20 gross to 8 gross. Confusingly, the load factors get smaller as the deck area gets bigger. The result is that the *bather load* stops increasing with deck area once the deck area is equal to twice the pool area. In this case, the maximum bather load is 8 square feet of water surface area per bather, or, equivalently, 24 square feet of deck and water surface per bather. When the deck area is equal to the water surface area, again the math comes out to 24 square feet of deck and water surface area per bather.

For Class D pools only, the *2024 ISPSC* does assign an occupant load. It requires a much larger load, with the load factor varying from 10 gross to 8 gross, this time with deck area considered at 15 gross (this changed in 2015 to harmonize it with IBC Table 1004.5. Previously it was 50 gross). These occupant loads are aggressively larger, but only if the jurisdiction has adopted the *ISPSC.* This increased load might be reasonable for heavily used wave pools and leisure rivers, but other Class D pools can only be used by a few users at a time, for instance floating lily pad walks, climbing walls, water slides, etc, so that increase does not make much sense in these cases.

The *Model Aquatic Health Code* assigns occupant load factors ranging from 10 to 20 square feet for water surface area, but only one occupant per 50 square feet on the deck. This is roughly a mirror image of the current *International Building Code.*

Justification of changes occupant loads in IBC Table 1004.5 and ISPSC 608.1

· **Swimming pool areas with water depth exceeding 5 ft** – users do not lounge or congregate in these areas because keeping one's head above water requires constant effort. They are doing activities such as lap swimming, diving, synchronized swimming, and water polo. The highest density of these activities is water polo, with a pool area as small as 20 meters by 10 meters being used by two teams of seven players each. The result is one occupant per 150 square feet.

· **Spa areas –** The *Model Aquatic Health Code* and *Florida Building Code* both assign 1 occupant or bather per 10 square feet. It would not be conservative for the *International Building Code* to ignore this guidance.

· **Catch pools –** The slides are supervised and people are not permitted to go down the slide unless the area is clear.

· **All other swimming pool areas and decks –** Currently these areas are treated very differently. We have observed users congregating in pools tighter than one per 50 square feet. As for the deck, it is reasonable to think that people congregate in deck areas similar to unconcentrated assembly seating or airport terminal waiting areas (which both get a load factor of 15), however, most of these people "reserve" a movable chair for themselves with a towel or purse and then proceed to the pool. Increasing this factor to 24 accounts for the fact that some people stay in this area, but most reserve a space in the area before moving on to another area. Assigning the same factor to both areas is logical when you consider the increased number of tanning ledges that are being installed recently. Such areas are basically used the same as deck, mainly used by people standing or in lounge chairs, yet the load factor is different. The load factor should be the same.

· **Class D-1, D-4, and D-6 pool deep areas –** These bodies of water do not tend to have deep areas, and even when they do, ropes are placed to discourage users from using them. The occupant load factors for shallow areas and decks have been left alone so that the egress requirements for these types of pools will not change. However, in past versions of the code the Class D minimum fixture count was not based on this very high number of occupants. In the 2018 code, a Leisure River with 7500 square feet of water and 7500 square feet of deck would have 1,438 occupants but only require 2 water closets for females. We are proposing that the occupant count would remain 1,438, but that number brought to the proposed revision of Table 2902 computes to 7 water closets for females. That is roughly similar to what the current code would call for on an indoor class A, B, or C pool, and that is too high. So this proposal adds a clause to Section 608 of the *ISPSC* that Table 608 should not be used for fixture count, rather Table 1004.5 of the *IBC* should be used. This way changing a pool from Class C to Class D will have no impact on the minimum fixture count, but it would have an impact on egress and other occupant count related items. The minimum fixture count for the Leisure River mentioned above would be 4 water closets for females.

· **Other Class D pools –** This includes catch pools, activity pools, and vortex pools. These pools are meant to be used by distinct groups of supervised users one at a time. Letting them default back to one occupant per 24 square feet rather than one per 8 square feet is still conservative.

Summary of changes occupant loads resulting from this proposal

The changes to 1004.5 under this proposed change would give:

Class A, B, or C Pool, 5' deep or less, with

deck area *less than* pool area

Slightly *more* occupants

deck area *equal* to pool area

The *same* number occupants

deck area *more than* pool area

Slightly *fewer* occupants

Catch Pools

~ 100x *fewer* occupants

Wave Pools, Leisure Rivers, Interactive Water Features, 5' deep or less

The *same* (very large) number of occupants

Activity Pools, Vortex Pools, Pool areas greater than 5' deep

3x *fewer* occupants

Spa Pools

5x *more* occupants

Minimum Fixture Count in 2018 I-codes

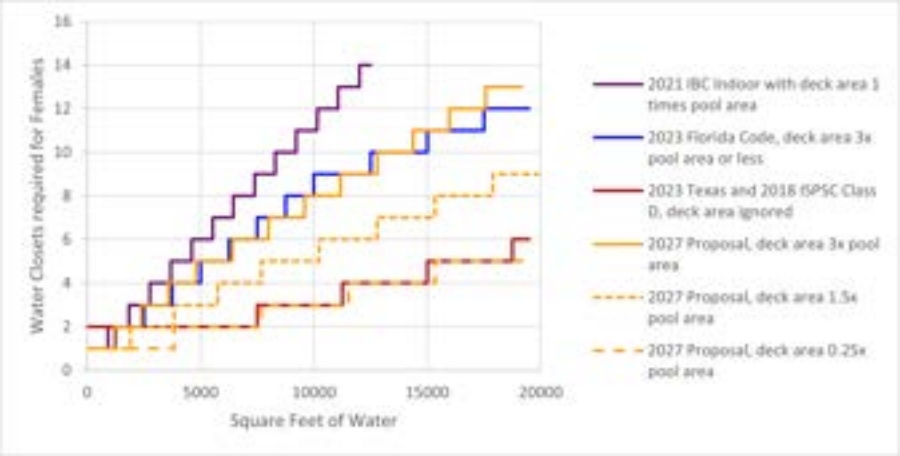
The *International Swimming Pool and Spa Code 2018* assigned a minimum fixture count to all Class D pools. This fixture count overruled Table 2902 in the *IBC.* In this code year, the result was a Class D pool would be assigned many more occupants than a Class A, B, or C pool. But if it was indoors, it would be assigned many fewer minimum restroom fixtures than a similar Class A, B, or C pool. If it was outdoors, it would be assigned the same small number of fixtures, even though a Class A, B, or C pool would not have any minimum number of fixtures. In the 2021 code cycle, section 609 of the *International Swimming Pool and Spa Code* was truncated, leaving only a minimum number of showers, not of toilets or lavatories, for outdoor pools and Class D pools.

Minimum Fixture Count in current codes

The *International Building Code* assigns fixtures to occupants, of indoor pools, and assigns occupants both to the deck area and the pool water area. No fixtures are assigned to occupants of outdoor pools. In effect, fixtures are assigned both to areas of the deck and areas of the pool. The other state-level codes surveyed in this effort are for Florida and Texas. In Texas, the deck area is ignored entirely. In Florida, it is ignored for all deck area less than 3x of the pool area, which practically includes all pool decks. But in the current *IBC,* for indoor pools only, the deck area becomes a much more important factor than the pool area. The number of fixtures required by this code is already significantly more than Florida would require even when the deck is only 1x of the pool area. The reason is because the occupants of a pool and pool deck are treated the same as the occupants of a stadium or arena in terms of their need to use the bathroom. Meanwhile Texas, ignoring the pool area, their code gives a result that is much lower for the same pool. But Texas didn't make this up, rather, their table comes from section 609 of the 2018 ISPSC.

Justification of new row in IBC Table 2902.1

The intent of adding a new row, rather than using the existing rows for coliseums and arenas, is to reduce the number of fixtures required. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. The calculation results in the new orange lines shown in the graph below, with the existing codes still shown for reference. The new code proposal will agree closely with the Florida Code when the deck is 3x the pool area, and agree closely with the Texas code when only minimal deck is provided.



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

For indoor pools and Class D pools plumbing fixture requirement will be about the same. Indoor pool plumbing fixture requirements will be reduced. Outdoor pool plumbing fixture requirements will be increased. Overall, the number of plumbing fixtures will be slightly decreased.

P19-24 Part III

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification:
321.2 Number of fixtures.
The minimum number of required water closets, urinals, lavatories, and drinking fountains fixtures shall be provided in accordance with the minimum requirements of the *International Building Code* and the *International Plumbing Code*.

Exception: For Class C swimming pools, fixtures dedicated to the pool area shall not be required where all sleeping or dwelling units meet all of the following requirements:

1. The sleeping or dwelling units have private facilities.
2. The sleeping or dwelling units are within a 300 feet path of travel from the pool area.
3. The sleeping or dwelling units are not more than one story above or below the pool area.

For Class C swimming pools where some but not all sleeping or dwelling units meet the requirements of this exception, the minimum occupant load used to calculate the minimum fixture requirements shall be reduced by a factor equal to the number of sleeping or dwelling units meeting these requirements, divided by the total number of sleeping or dwelling units served by the pools.

Committee Reason: For the modification: The language needed to include hotel and motel occupancies. (11-0)
For the proposal as modified: This proposal achieves the goal of the pool industry to have better clarity for which types of showers are needed for different pools. The Committee would welcome further input from opponents at CAH#2 to improve the proposals. The Committee suggested that the opponents can work with PHTA. (11-0)

Individual Consideration Agenda

Comment 1:

ISPSC: 321.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Swimming Pool and Spa Code

Revise as follows:

321.2 Number of fixtures. The minimum number of required water closets, urinals, lavatories, and drinking fountains fixtures shall be provided in accordance with the minimum requirements of the *International Building Code* and the *International Plumbing Code*.

Exception: For Class C swimming pools, fixtures dedicated to the pool area shall not be required where all sleeping or dwelling units meet all of the following requirements:

1. The sleeping or dwelling units have private facilities.
2. The sleeping or dwelling units are within a 300 feet path of travel from the pool area.
3. The sleeping or dwelling units are not more than ~~one story~~ three stories above or below the pool area, or more than three stories where serviced by an elevator.

For Class C swimming pools where some but not all dwelling units meet the requirements of this exception, the minimum occupant load used to calculate the minimum fixture requirements shall be reduced by a factor equal to the number of dwelling units meeting these requirements, divided by the total number of dwelling units served by the pools.

Reason: Class C pools are associated with buildings that already have private toilet facilities for the people who dwell or sleep in those buildings. Where those buildings are 3 stories or less are served by an elevator and the travel distance is not more than 300 feet, past experience has shown that this arrangement is adequate for serving the needs of pools users.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The original proposal limited the travel distance to 300 feet. This comment simply clarifies that the path of travel could involve an elevator where buildings are 3 stories or less. The comment does not require any additional materials or labor and thus there is no cost impact.

Comment (CAH2)# 331

Comment 2:

ISPSC: SECTION 202, 321.3.1

Proponents: Misty Guard, Regulosity LLC, Regulosity LLC (misty.guard@regulosity.com); Jennifer Hatfield, J. Hatfield & Associates, Pool & Hot Tub Alliance (jen@jhatfieldandassociates.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Swimming Pool and Spa Code

Revise as follows:

SHOWER. A device that sprays water on the body.

Cleansing.
A shower located within a hygiene facility using ~~warm~~ water and soap. The purpose of showers is to remove contaminants including perianal fecal material, sweat, skin cells, personal care products, and dirt before bathers enter the aquatic venue.

Rinse. A shower typically located in the pool deck area ~~with ambient temperature water~~. The main purpose is to remove dirt, sand, or organic material prior to entering the aquatic venue to reduce the introduction of contaminants and the formation of disinfection byproduct.

321.3.1 Temperature. At each cleansing shower~~head~~, hot or tempered water shall be provided as required by the *International Plumbing Code*. Where hot and cold water is supplied to a rinse shower, the temperature of the water supply shall only be controlled by a thermostatic mixing valve, a limiting device, or a water heater as required by the International Plumbing Code.

~~**Exception:** Water supplied to rinse showers shall not be required to be heated~~

Reason: This proposal clarifies the language in the ISPSC. These modifications align with existing IPC requirements that cleansing and rinse showers currently comply with, if provided with hot and cold water. Rinse showers are specific to the ISPSC. The modification includes water temperature safety device requirements from the IPC to ensure the water temperature requirements for rinse showers in the ISPSC meet shower water temperature safety requirements in the IPC.

Bibliography: None

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There will be no increase in the cost of construction. This proposal clarifies the language in the ISPSC. These modifications align with existing IPC requirements that cleansing and rinse showers currently comply with, if provided with hot and cold water.

Comment (CAH2)# 589

P26-24

IPC: 403.3; IBC: [P] 2902.3

Proposed Change as Submitted

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Plumbing Code

Revise as follows:

403.3 Employee and public toilet facilities. For structures and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with *public* toilet facilities. Employees associated with structures and tenant spaces shall be provided with toilet facilities. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users. Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities. **Exception:** *Public* toilet facilities shall not be required for:

1. Parking garages and self-service storage facilities operated without ~~parking~~ attendants.
2. Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

2024 International Building Code

Revise as follows:

[P] 2902.3 Employee and public toilet facilities. For *structures* and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with public toilet *facilities*. Employees associated with *structures* and tenant spaces shall be provided with toilet *facilities*. The number of plumbing fixtures located within the required toilet *facilities* shall be provided in accordance with Section 2902 for all users. Employee toilet *facilities* shall be either separate or combined employee and public toilet *facilities*. **Exception:** Public toilet *facilities* shall not be required for:

1. Parking garages and self-service storage facilities operated without ~~parking~~ attendants.
2. *Structures* and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

Reason: Self-service storage facilities are low occupancy. Facilities operating without attendants are often exempted from the restroom requirements by local building code officials for the same reason unattended parking garages are exempted. Codifying this helps maintain continuity in the Code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

- $20,000 to - $25,000 per restroom not required.

Estimated Immediate Cost Impact Justification (methodology and variables):

A single-unit restroom costs about $20,000 - $25,000.

Restroom privacy and sensible construction - Page 5 of 5 - Construction Specifier (www.constructionspecifier.com/restroom-privacy-and-sensible-construction/5/), accessed 1/26/2024

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The Committee can't justify allowing deletion of facilities where employees are present. (14-0)

Individual Consideration Agenda

Comment 1:

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com) requests As Submitted

Reason: Self-service storage facilities are low occupancy. Facilities operating without attendants are often exempted from the restroom requirements by local building code officials for the same reason unattended parking garages are exempted. Unattended restrooms present a security concern. Codifying this helps maintain continuity in the Code and helps avoid unsafe conditions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

P30-24

IPC: 405.3.4 (New), 405.3.4, 405.3.5, CHAPTER 15, IAPMO Chapter 15 (New)

Proposed Change as Submitted

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Add new text as follows:

405.3.4 Premanufactured water closet and urinal partitions. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10.

Revise as follows:

~~**405.3.4**~~**405.3.5 Water closet privacy ~~compartment~~.** Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Premanufactured partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B privacy requirements of IAPMO Z124.10. Water closets located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the water closet shall be located in separate room with a lockable door. **Exceptions:**

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

~~**405.3.5**~~**405.3.6 Urinal ~~partitions~~ privacy.** Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. Premanufactured partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C privacy requirements of IAPMO Z124.10. The horizontal dimension between walls ~~or partitions~~ at each urinal shall be not less than 30 inches (762 mm). The walls ~~or partitions~~ shall ~~begin at a height not greater than 12 inches (305 mm) from and~~ extend not less than 60 inches (1524 mm) above the finished floor surface. The walls ~~or partitions~~ shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the urinals shall be located in a separate room. **Exceptions:**

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

CHAPTER 15
REFERENCED STANDARDS

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.10-22	Standard for Water Closets and Urinal Partitions

Reason: IAPMO Z124.10 is a new standard that regulates water closet and urinal partitions. The standard was published in 2022. The standard specified three different privacy ratings. In addition, there are tests for the quality of the partition. The tests include load, coating, surface examination, subsurface, colorfastness, stain resistance, wear and cleanability, chemical resistance, and stress test to name a few.

Type A privacy partitions are intended for all gender toilet rooms and provide the highest level of privacy. The standard states the following privacy requirements, “The bottom edge of the partition including the door shall be located less than or equal to 100 mm (4 in) off the finished floor. The top edge of the partition including the door shall be located greater than or equal to 2.13 m (84 in) above the finished floor. The full height of the door to the partitions on both sides shall prevent any visual observation from the outside of the partition enclosure. Doors shall be lockable from the inside of the partition enclosure. The door locking device shall be readily distinguishable as locked from the outside of the partition enclosure.” Furthermore, the standard requires a visual indication that the compartment is occupied when the partition door lock is activated.

Type B privacy partitions are standard water closet partitions found in separate gender toilet rooms. The standard states the following for privacy, “The bottom edge of the partition including the door shall be located within 406 mm (16 in) of the finished floor. The top edge of the partition including the door shall be located greater than or equal to 1.75 m (69 in) above the finished floor. The door to the partitions shall have a maximum of 13 mm (½ in) gap between the edge of the door and the wall of the partition. Doors shall be lockable from the inside of the partition enclosure.”

Type C privacy partitions are urinal partitions. The standard specifies the following requirements, “The bottom of the urinal partition shall be located a maximum of 406 mm (16 in) above the finished floor. The top of the urinal partition shall be a minimum of 1.5 m (60 in) above the finished floor. The urinal partition shall extend a minimum of 457 mm (18 in) from the wall.”

With the increase in the number of all gender toilet rooms, it is important to have proper privacy requirements to assure both privacy and security. This proposed change will require water closets and urinals in all gender toilet rooms to be enclosed in Type A privacy partitions or be located in a separate room. This will provide the highest level of privacy and security.

Type B privacy partitions are standard water closet partitions found in men’s and ladies’ rooms today. However, the gap between partition sections or between the door and frame have been reduced to ½ inch. Currently, there is no regulation on the gap in partitions nor are there any regulations for the quality of the partitions.

Type C privacy partitions are urinal partitions currently found in men’s rooms. Type C partitions are only intended for separate gender toilet rooms. In all gender toilet rooms, urinals are located similar to water closets to ensure privacy.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0.12 to $6.04 per partition, dependent on partition production volume.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change could increase the cost of construction. It should be noted that manufacturers are prohibited by Federal Law to discuss prices. That being stated, one can review the cost of listing a product on-line. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. In an attempt to find out the listing costs, one can check the ICC-ES website. The questions of what a cost of a listing is results in the following answer: Fees may vary. Contact us for a Statement of Work and/or an initial estimate. Similarly, IAPMO R&T does not publish fees. One can only request a quote for a listing. A Google search for the cost of a UL listing identified the cost as ranging between $5,000 and $50,000. Intertek advertises an annual listing fee of $6,040 for a single sanitary product, which is what a partition would likely be classified as. Hence, the exact dollar amount for a listing is unknown. That listing cost may or may not be added to the cost of the product. If it is added to the cost of the product, that additional cost will add to the cost of construction. However, manufacturers do not indicate if listing costs increase the cost of the product (construction). Hence, the impact is unknown. If one assumes the Intertek price for a listing and further assumes that the manufacturer sells 50,000 partitions a year, the increase cost of construction per partition could be assumed to be $0.12. If they only sell 1,000 partitions, the increased cost per partition would be $6.04.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There is ambiguity about the fire testing requirements in the standard. The cost of testing for the listing of the products will be onerous. This language puts the requirements for Type C units in the code. So what happens if the standard changes? Would the code need to change to math the standard? (8-7)

Individual Consideration Agenda

Comment 1:

IPC: 405.3.4

Proponents: Tim Earl, GBH International, Self (tearl@gbhint.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Plumbing Code

Revise as follows:

405.3.4 Premanufactured water closet and urinal partitions. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10. High-density polyethylene (HDPE) and polypropylene (PP) partitions shall also comply with Section 803.9 of the *International Building Code.*

Reason: The committee disapproved this proposal in part due to "ambiguity about the fire testing requirements in the standard." This comment addresses that.

Section 803.9 of the IBC contains fire test requirements for HDPE and PP used as interior finish. Toilet room partitions are included in the IBC definition of interior finish. Therefore, they must comply with Section 803.9 of the IBC. The test referenced in 803.9 is necessary to obtain meaningful performance data from these materials, whose melting and dripping behavior can produce misleadingly positive results in other fire tests.

Since IAPMO Z124.10 contains a different fire test, users may erroneously believe that no other fire testing is required of partitions. The addition of this specific reference to 803.9 for HDPE and PP will ensure that the proper testing is not overlooked.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Since this is simply a pointer to the applicable section of the IBC, there is no impact on cost.

Comment (CAH2)# 61

Comment 2:

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com) requests As Submitted

Reason: The Committee stated that there is ambiguity regarding the fire testing requirements. That is not correct. The IAPMO Z124.10 standard has fire testing similar to other IAPMO Z124 products. These tests are based on plumbing requirements. Other products requiring IAPMO A124 fire tests includes shower enclosures, Section 421.1 references CSA B45.5/IAPMO Z124, lavatories, Section 419.1 references CSA B45.5/IAPMO Z124, laundry trays, Section 418.1 references CSA B45.5/IAPMO Z124, sinks, Section 422.1 references CSA B45.5/IAPMO Z124, urinals, Section 424.1 references CSA B45.5/IAPMO Z124, and water closets, Section 425.1 references CSA B45.5/IAPMO Z124. The Building Code has separate requirements for certain building materials. Any fire test requirement is specified in the Building Code, not the Plumbing Code. The Codes always work together. The majority of partitions regulated by IAPMO Z124.10 do not have any additional fire testing required by the Building Code.

Another reason given for disapproval was that the cost of listing is onerous. Section 303.4 requires all plumbing products that must comply with a standard to be third party listed. If it is considered onerous for partitions, it should be considered onerous for every plumbing product. However, plumbing manufacturers recognize and accept that a part of doing business requires their products to be listed by a third-party agency. Bradley has all of its plumbing products listed. While some may consider it onerous, it is the cost of doing business in the profession.

When the first IPC was published in 1995, listing by a third-party agency was not required. The code officials proposed a change to a later edition to require all plumbing products to be listed by a third-party agency. None of the plumbing manufacturers objected to this change since it was already standard practice in the profession. Therefore, it should not be considered any more onerous for a premanufactured partition to be listed than any other plumbing product.

The final reason given for disapproval was regarding the dimensions for a urinal partition. Type C urinal partitions regulated by IAPMO Z124.10 have dimensional requirements that currently match what is listed in the code. If for some reason the dimensions in IAPMO Z124.10 are modified, there would not be a need to propose any changes for consistency. The dimensions listed in the Plumbing Code are for walls or partitions that are not premanufactured. Hence, the dimensions do not have to match, but in all likelihood, they probably always will. This is not a technical reason for disapproving of the proposed change.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 241

P31-24

IPC: 405.4.3

Proposed Change as Submitted

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

405.4.3 Securing wall-hung water closet bowls and urinals. Wall-hung water closet bowls and urinals shall be supported by a concealed metal carrier that is attached to the building structural members so that strain is not transmitted to the fixture connector or any other part of the plumbing system. The carrier shall conform to ASME A112.6.1M or ASME A112.6.2.

Reason: The ASME A112.6.1 and ASME A112.6.2 standards includes requirements for floor-affixed supports that can be used to secure off the floor water closets and as well as urinals.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification of which fixtures the standards includes, supports already used for urinals and water closets.

P31-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Urinals do not need carriers as users are not sitting on urinals like they do for wall hung water closets. (11-3)

P31-24

Individual Consideration Agenda

Comment 1:

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com) requests As Submitted

Reason: The reason given for rejection is that urinals do not need carriers since the user is not sitting on the urinal. This statement is inaccurate. The use of carriers is not based on someone sitting on a fixture. The carrier facilitates the proper installation of the fixture. When a fixture, such as a water closet, has a load based on a person sitting on the fixture, additional load testing is required by the standard. For a urinal carrier that are no such load tests, but that are tests for proper connection and support of the urinal.

The urinal fixture standard, ASME A112.19.2/CSA B45.1 states that a carrier is required for a wall-hung urinal. This is consistent with the language in the proposed change.

It should be recognized that I am a member of ASME A112 Committee, however, I am NOT authorized to submit this comment on behalf

of the Committee.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 652

P33-24

IPC: SECTION 202 (New), SECTION 202, 410.4

Proposed Change as Submitted

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Add new definition as follows:

BOTTLE FILLING STATION. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into water bottles or containers not less than 10 inches (254 mm) in height. Such fixture is connected to both the potable water distribution system and sanitary drainage system of the premises. See also *water dispenser.*

Revise as follows:

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. Such fixtures include bottle filling stations.

410.4 Substitution. Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* ~~where three or more drinking fountains are required, *water dispensers*~~ bottle filling stations not combined with a drinking fountain shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. Bottle filling stations combined with a drinking fountain shall be permitted to be substituted for all drinking fountains.

Reason: When Covid hit the country in 2020, every single drinking fountain in the country was no longer available. Since the IPC has been designed to make sure that the general public has access to free drinking water at all times, this created a problem. What I'm trying to do with this code change is allow the use of a bottle filling station to be used in lieu of a drinking fountain in all occupancy groups. If a bottle filling station is associated with a drinking fountain, then those can be substituted directly for a drinking fountain. If the bottle filling station does not also contain a drinking fountain, then the substitution ratio is fifty percent.

Just during the 2023 year, Michigan, Illinois, Vermont, Maine and Delaware passed legislation to require for bottle filling stations in educational occupancies. Both Maine and Vermont have language that specifically states "sanitary reasons" for the use of the bottle filler. Many states allow for the use of a combination drinking fountain/bottle filling station as an option for the required drinking fountain. In addition, the State of Washington allows for the bottle filling station and/or combination of a drinking fountain/bottle filling station for each drinking fountain required. Their point is to eliminate public waste with all the plastic bottles. Pennsylvania also has legislation encouraging the reduction in the use of plastics by allowing substitution of the bottle filling station for the required drinking fountains.

The State of Massachusetts recently enacted a ban on the purchase of single use plastic bottles for state agencies. The National Park Service began phasing out the sale of single use plastic bottles in 2022.

In September 2023, the United Nations published the "Zero Draft of the Plastics Treaty", which a portion addresses the plastics pollution concern.

Do we want plumbing fixtures to be dictated by state or even national requirements or by the building and/or plumbing code? The IPC needs to be the leader here and allow for the substitution of bottle filling stations for drinking fountains.

I have modified the definition of water dispenser to include a bottle filling station, as a bottle filling station meets these requirements. In addition, I have provided a definition of a bottle filling station to account for the minimum requirements needed to provide for a bottle or similar container. A bottle filling station would comply with the requirements of UL 399 as noted in IPC 410.1.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0 to $1100

Estimated Immediate Cost Impact Justification (methodology and variables):

I opted to reflect the increase as the cost of a bottle filling station may be more than that of a drinking fountain. However, a decrease may actually occur.
There may be minimal cost impact due to the legislative requirements in many states.

Based upon pricing available online, a typical hi-lo drinking fountain runs between $1000 and $2200 depending on the aesthetics of the fountain.

A single bottle filling stating ranges from $590 to $1100 depending on aesthetics and whether or not the filling station also includes a drinking fountain.

A dual hi-lo drinking fountain combined with a bottle filling station can range from $1400 to $1900.

Based on these numbers, no increase may occur. If a dual hi-lo drinking fountain is installed and a bottle filling station is installed in addition to the drinking fountain, then an increase of up to $1100 could occur.

However, if a combination hi-lo drinking fountain combined with a bottle filling station is installed, a decrease may occur depending on the aesthetics of the units provided.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P33-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal needs rework as the proponent tried tro present multiple modifications (all ruled out of order) where they attempted to fix the proposal. (11-3)

P33-24

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202, 410.4

Proponents: Eirene Knott, BRR Architecture, BRR Architecture (eirene.knott@brrarch.com); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

BOTTLE FILLING STATION. A plumbing fixture that is ~~manually~~ controlled by the user for the purpose of dispensing potable drinking water into water bottles or containers not less than 10 inches (254 mm) in height. Such fixture is connected to both the potable water distribution system and sanitary drainage system of the premises. See also *water dispenser.*

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. Such fixtures include bottle filling stations.

Revise as follows:

410.4 Substitution. Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* water dispensers or bottle filling stations not combined with a drinking fountain shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. Bottle filling stations combined with a drinking fountain shall be permitted to be substituted for all drinking fountains.

Reason: This proposed modification incorporates floor modifications that were attempted to be brought up for discussion at the Orlando Hearings. Manually has be removed from the definition of bottle filling station. Water dispenser was added to the permitted substitution at the 50 percent level.

Cost Impact: Increase

Estimated Immediate Cost Impact:

See original proposal for impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original proposal for cost estimate

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

Comment (CAH2)# 268

NOTE: P42-24 PART I DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

P42-24 Part I

IPC: 413.1, ASME Chapter 15 (New)

Proposed Change as Submitted

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

413.1 Approval. Floor drains shall conform to ASME A112.3.1~~,~~ or ASME A112.6.3 ~~or CSA B79~~. Trench drains shall comply with ASME ~~A112.6.3~~ A112.6.8/CSA B79.8.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.8/CSA B79.8–2022 Trench Drains

Reason: The ASME A112.6.3 was harmonized with CSA B79 such that the CSA B79 designation is not used. The updated standard designation will be proposed in Group B Administrative standard updates. Trench drains are now covered under ASME A112.6.8/CSA B79.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification as to which standard is applicable to which product. Drains were already using the ASME standards for certification.

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P42-24 Part I

Public Hearing Results (CAH1)

Errata: This proposal includes published errata Errata: The proponent's name was missing from the proposal. See the Consolidated Monograph Updates document; https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (14-0)

P42-24 Part II

IRC: TABLE P2701.1, P2719.1, ASME Chapter 44 (New)

Proposed Change as Submitted

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

TABLE P2701.1 PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3
Bathtub/whirlpool pressure-sealed doors	ASME A112.19.15
Diverters for faucets with hose spray, anti-syphon type, residential application	ASME A112.18.1/CSA B125.1
Enameled cast-iron plumbing fixtures	ASME A112.19.1/CSA B45.2
Floor drains	ASME A112.6.3
Framing-affixed supports for off-the-floor water closets with concealed tanks	ASME A112.6.2
Hose connection vacuum breaker	ASSE 1052
Hot water dispensers, household storage type, electrical	ASSE 1023
Household disposers	ASSE 1008
Hydraulic performance for water closets and urinals	ASME A112.19.2/CSA B45.1
Individual automatic compensating valves for individual fixture fittings	ASME A112.18.1/CSA B125.1
Individual shower control valves anti-scald	ASSE 1016/ASME A112.1016/CSA B125.16
Macerating toilet systems and related components	ASME A112.3.4/CSA B45.9
Nonvitreous ceramic plumbing fixtures	ASME A112.19.2/CSA B45.1
Plastic bathtub units	CSA B45.5/IAPMO Z124; ASME A112.19.2/CSA B45.1
Plastic lavatories	CSA B45.5/IAPMO Z124
Plastic shower receptors and shower stalls	CSA B45.5/IAPMO Z124
Plastic sinks	CSA B45.5/IAPMO Z124
Plastic water closet bowls and tanks	CSA B45.5/IAPMO Z124
Plumbing fixture fittings	ASME A112.18.1/CSA B125.1
Plumbing fixture waste fittings	ASME A112.18.2/CSA B125.2; ASTM F409
Porcelain-enameled formed steel plumbing fixtures	ASME A112.19.1/CSA B45.2
Pressurized flushing devices for plumbing fixtures	ASSE 1016/ASME 112.1016/CSA B125.16; CSA B125.3
Specification for copper sheet and strip for building construction	ASTM B370
Stainless steel plumbing fixtures	ASME A112.19.3/CSA B45.4
Suction fittings for use in whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10
Temperature-actuated, flow reduction valves to individual fixture fittings	ASSE 1062
Thermoplastic accessible and replaceable plastic tube and tubular fittings	ASTM F409
Trench drains	~~ASME A112.6.3~~ ASME A112.6.8/CSA B79.8
Trim for water closet bowls, tanks and urinals	ASME A112.19.5/CSA B45.15
Vacuum breaker wall hydrant-frost-resistant, automatic-draining type	ASSE 1019
Vitreous china plumbing fixtures	ASME A112.19.2/CSA B45.1
Wall-mounted and pedestal-mounted, adjustable and pivoting lavatory and sink carrier systems	ASME A112.19.12
Water closet flush tank fill valves	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10

P2719.1 Floor and trench drains. *Floor drains* shall comply to ASME A112.6.3. Trench drains shall comply to ASME A112.6.8/CSA B79.8. *Floor drains* shall have waste outlets not less than 2 inches (51 mm) in diameter and a removable strainer. *Floor drains* shall be constructed so that the drain can be cleaned. Access shall be provided to the drain inlet. *Floor drains* shall not be located under or have their access restricted by permanently installed appliances.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.8/CSA B79.8–2022 Trench Drains

Reason: The ASME A112.6.3 was harmonized with CSA B79 such that the CSA B79 designation is not used. The updated standard designation will be proposed in Group B Administrative standard updates. Trench drains are now covered under ASME A112.6.8/CSA B79.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification as to which standard is applicable to which product. Drains were already using the ASME standards for certification.

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P42-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The staff analysis of new standard did not indicate that staff had reviewed the standard. (6-4)

P42-24 Part II

Individual Consideration Agenda

Comment 1:

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Submitted

Reason: For CAH1, there was an omission in the New Standards Analysis document that was posted online for the Committee to review. The standard ASME A112.6.8/CSA B79.8-2022 Trench Drains was not listed even though ICC had the standard by the submission deadline. Also, the standard was not posted online for the Committee review.

The New Standards Analysis document has been updated and the standard is now on the Committee standards viewing website.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 147

P44-24

IPC: 419.5

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

419.5 Tempered water for public hand-washing facilities. ~~*Tempered water* shall be delivered from lavatories and group wash fixtures located in *public* toilet facilities provided for customers, patrons and visitors.~~ Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for any occupancy with primary users being children, such as elementary schools, Sunday bible schools, and child daycare facilities or for any occupancy serving primarily elderly or other vulnerable occupants, and for any lavatories and group wash fixtures located in public use toilet facilities that are provided with a single delivered temperature faucet. *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Reason: Tempered water for public handwashing fixtures was the result of an overreach associated to trying to protect the users of bathtubs and showers from sudden changes in temperature. The protection for users of bathtubs and showers makes sense because the user is "captive" to the fixture when they use it. The same cannot be said for handwashing fixtures. This requirement was a massive overreach because the same risk level just isn't there. If a user of a handwashing fixture senses water is too hot or too cold, they can simply remove their hands from the stream of water. This proposal will still require protection for public facility users that would be most at risk, such as children and senior citizens in assisted care facilities.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Between $200-$500 for each unit that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

$100-$200 per unit and between $100-$300 for labor depending on the local labor costs.

P44-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The term "vulnerable occupants" is open to broad interpretation, Also, the use of "such as" opens the door for inclusion of many other applications. (13-0)

P44-24

Individual Consideration Agenda

Comment 1:

IPC: 419.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

419.5 Tempered water for public hand-washing facilities. Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for anyGroup E, Group I-1, Group I-2, Group I-3, or Group I-4 occupancy and occupancies that are referenced in sections 305.2 through 305.4 of the International Building Code, and for any lavatories and group wash fixtures located in public use toilet facilities that are provided with a single delivered temperature faucet not controlled by the user. *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Reason: Tempered water for public handwashing fixtures was the result of an overreach associated to trying to protect the users of bathtubs and showers from sudden changes in temperature. The protection for users of bathtubs and showers makes sense because the user is "captive" to the fixture when they use it. The same cannot be said for handwashing fixtures. This requirement was a massive overreach because the same risk level just isn't there. If a user of a handwashing fixture senses water is too hot or too cold, they can simply remove their hands from the stream of water. This proposal will still require protection for public facility users that would be most at risk by referencing the specific use groups as well as some special occupancies listed in section 308.5.2 though 308.5.3 of the IBC.

Bibliography: As suggested by members of the IPC Code Development Committee during CAH #1, the language was modified to reference the use groups rather than "vulnerable occupants".

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Between $200-$500 for each unit that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

$100-$200 per unit and between $100-$300 for labor depending on the local labor costs.

Comment (CAH2)# 392

P52-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

HEAT INTERFACE UNIT. A unit including one or more double wall heat exchangers and control devices for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.

Add new text as follows:

501.10 Heat Interface Unit. Installed heat interface units shall contain a proportional control valve that is third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Section 608 would be a better location for this information. (12-1)

P52-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202, 501.10, 608.14.10 (New), ASSE Chapter 15

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

HEAT INTERFACE UNIT. ~~A unit including one or more double wall heat exchangers and control devices for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.~~ A prefabricated, water-heating device that utilizes a building's hydronic hot water system along with a double wall heat exchanger and a proportional flow control valve or other acceptable means of temperature control, to create domestic potable hot water for a dwelling unit.

501.10 Heat Interface Unit. ~~Installed heat interface units shall contain a proportional control valve that is third-party certified to ASSE 1379.~~ Heat interface units shall be sized and installed in accordance with the manufacturer's installation requirements. Heat interface units shall contain a means to control output temperature to the designed temperature and shall limit the water supplied to the potable hot water distribution system to a temperature of 140ºF (60ºC) or less.

Add new text as follows:

608.14.10 Proportional flow control devices. Where proportional flow control devices contain protection from cross-connection via hydronic water, such devices shall conform to ASSE 1379.

Revise as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20~~xx~~24	Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations

Reason: This comment revises the original proposal by moving the cross-connection requirements to Section 608 as discussed at the CAH#1. This comment also revises the definition of Heat Interface Unit as it was discussed in testimony that this definition is too broad

and all encompassing. Requirements for design and installation are added to Section 501.10. Additional information is provided in the attached files for clarification.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **AquaPort™-White-Paper.pdf**
  https://www.cdpaccess.com/comment/440/32234/files/download/7900/
- **aquaport-manual.pdf**
  https://www.cdpaccess.com/comment/440/32234/files/download/7899/

Comment (CAH2)# 440

Comment 2:

IPC: SECTION 202, 501.10, ASSE Chapter 15

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The Standard ASSE 1379 is an published ANSI Standard which it was not at the CAH #1 Group A in April 2024.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 672

P52-24 Part II

IRC: SECTION 202 (New), P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proposed Change as Submitted

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

HEAT INTERFACE UNIT. A unit including one or more double wall heat exchangers and control elements for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.

Add new text as follows:

P2805
HEAT INTERFACE UNIT

P2805.1 Heat interface unit. Installed heat interface units shall contain proportional control valves that are third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Standard is not complete. Definition is too broad and confusing. What is or is not a Heat Interface unit? (10-0)

P52-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: SECTION 202, P2805, P2805.1, P2902.3.8 (New), ASSE Chapter 44

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

HEAT INTERFACE UNIT. ~~A unit including one or more double wall heat exchangers and control elements for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.~~
A prefabricated, water-heating device that utilizes a building's hydronic hot water system along with a double wall heat exchanger and a proportional flow control valve, or other acceptable means of temperature control, to create domestic potable hot water for a dwelling unit

P2805
HEAT INTERFACE UNIT

P2805.1 Heat interface unit. ~~Installed heat interface units shall contain proportional control valves that are third-party certified to ASSE 1379.~~ Heat interface units shall be sized and installed in accordance with the manufacturer's installation requirements. Heat interface units shall contain a means to control output temperature to the designed temperature, and shall limit the water supplied to the potable hot water distribution system to a temperature of 140°F (60°C) or less.

Add new text as follows:

P2902.3.8 Proportional flow control devices. Where proportional flow control devices contain protection from cross-connection via hydronic water, such devices shall conform to ASSE 1379.

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20~~xx~~24	Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations

Reason: This comment revises the original proposal by moving the cross-connection requirements to Section P2902.3 as discussed at the CAH#1. This comment also revises the definition of Heat Interface Unit as it was discussed in testimony that this definition is too broad and all encompassing. Requirements for design and installation are added to Section P2805. Additional information is provided in the attached files for clarification.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **AquaPort™-White-Paper.pdf**
  https://www.cdpaccess.com/comment/443/32235/files/download/7904/
- **aquaport-manual.pdf**
  https://www.cdpaccess.com/comment/443/32235/files/download/7903/

Comment (CAH2)# 443

Comment 2:

IRC: SECTION 202, P2805, P2805.1, ASSE Chapter 44

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The Proposal was disapproved due to the ASSE 1379 Standard was not Published under ANI at the CAH #1 in April 2024. The Standard ASSE 1379 is now completed and published under the ANSI process.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 676

P53-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

501.10 Indirect-fired water heaters. Where indirect-fired water heaters contain proportional control valves, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Life Cycle Cost Impact:

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: ASSE 1379 is only in draft form and is not complete. These valves are part of an equipment package. Indirect "fired" seems to be an inappropriate term to be used in the definition. (13-0)

P53-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202, 501.10, 608.14.10 (New), ASSE Chapter 15

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

INDIRECT ~~FIRED~~ WATER HEATER. ~~A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.~~
A prefabricated, water-heating device that utilizes a building's hydronic hot water system along with a double wall heat exchanger and a proportional flow control valve, or other acceptable means of temperature control, to create domestic potable hot water for a dwelling unit.

501.10 Indirect ~~fired~~ water heaters. ~~Where indirect fired water heaters contain proportional control valves, such valves shall be third-party certified to ASSE 1379.~~
Indirect water heaters shall be sized and installed in accordance with the manufacturer's installation requirements. Indirect water heaters shall contain a means to control output temperature to the designed temperature, and shall limit the water supplied to the potable hot water distribution system to a temperature of 140°F (60°C) or less.

Add new text as follows:

608.14.10 Proportional flow control devices. Where proportional flow control devices contain protection from cross-connection via hydronic water, such devices shall conform to ASSE 1379.

Revise as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/IAPMO/ANSI/CAN 1379-2024 ~~1379-20xx~~	~~Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations~~ Performance Requirements for Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations

Reason: This comment revises the original proposal by moving the cross-connection requirements to Section 608 as discussed at the CAH#1. This comment also revises the definition of Indirect Water Heater as it was discussed in testimony that this definition is too broad and all encompassing. This also removes the word "fired" from the definition title as the committee expressed issues with this term. The US Department of Energy also describes Indirect Water Heaters on this site: Tankless Coil and Indirect Water Heaters | Department of Energy
Requirements for design and installation are added to Section 501.10. Additional information is provided in the attached files for clarification.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **aquaport-manual.pdf**
  https://www.cdpaccess.com/comment/442/32236/files/download/7902/
- **AquaPort™-White-Paper.pdf**
  https://www.cdpaccess.com/comment/442/32236/files/download/7901/

Comment (CAH2)# 442

Comment 2:

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The ANSI ASSE 1379 Standard is now completed and published.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 680

P53-24 Part II

IRC: SECTION 202 (New), SECTION P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proposed Change as Submitted

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

[MP] INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

SECTION P2805
INDIRECT-FIRED WATER HEATERS

P2805.1 Indirect-fired water heaters. Where indirect-fired water heaters contain a proportional control valve, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Standard is not complete. Definition is confusing. (10-0)

P53-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: SECTION 202, SECTION P2805, P2805.1, P2902.3.8 (New), ASSE Chapter 44

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

[MP] INDIRECT-~~FIRED~~ WATER HEATER. ~~A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.~~

A prefabricated, water-heating device that utilizes a building's hydronic hot water system along with a double wall heat exchanger and a proportional flow control valve, or other acceptable means of temperature control, to create domestic potable hot water for a dwelling unit.

SECTION P2805
INDIRECT-~~FIRED~~ WATER HEATERS

P2805.1 Indirect-~~fired~~ water heaters. ~~Where indirect fired water heaters contain a proportional control valve, such valves shall be third-party certified to ASSE 1379.~~

Indirect water heaters shall be sized and installed in accordance with the manufacturer's installation requirements. Indirect water heaters shall contain a means to control output temperature to the designed temperature and shall limit the water supplied to the potable hot water distribution system to a temperature of 140°F (60°C) or less.

Add new text as follows:

P2902.3.8 Proportional flow control devices. Where proportional flow control devices contain protection from cross-connection via hydronic water, such devices shall conform to ASSE 1379

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/IAPMO/ANSI/CAN 1379-2024 ~~1379-20xx~~	~~Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations~~ Performance Requirements for Proportional Flow Control Devices, with Protection from Cross-Connection via Hydronic Water, for use in Potable Water Installations

Reason: This comment revises the original proposal by moving the cross-connection requirements to Section P2902 as discussed at the CAH#1. This comment also revises the definition of Indirect Water Heater as it was discussed in testimony that this definition is too broad and all encompassing. This also removes the word "fired" from the definition title as the committee expressed issues with this term. The US Department of Energy also describes Indirect Water Heaters on this site:

Tankless Coil and Indirect Water Heaters | Department of Energy
Requirements for design and installation are added to Section P2805. Additional information is provided in the attached files for clarification.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Immediate Cost Impact Justification (methodology and variables):

This is an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **AquaPort™-White-Paper.pdf**
  https://www.cdpaccess.com/comment/444/32237/files/download/7906/
- **aquaport-manual.pdf**
  https://www.cdpaccess.com/comment/444/32237/files/download/7905/

Comment (CAH2)# 444

Comment 2:

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The ASSE 1379 Standard is now published under ANSI.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 683

P54-24 Part I

IPC: SECTION 202 (New), SECTION 502, 502.1, SECTION 506 (New), 506.1 (New), 506.2 (New), 506.3 (New), 506.3.1 (New), 506.3.2 (New), 506.4 (New), 506.5 (New), 506.5.1 (New), TABLE 506.5.1 (New), 506.5.2 (New), TABLE 506.5.2 (New), 506.5.3 (New), 506.5.4 (New)

Proposed Change as Submitted

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Plumbing Code

Add new definition as follows:

WATER HEATER, HEAT PUMP, AIR SOURCE. A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:

1. Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.
2. Split systems where the heat pump and storage tank are separate assemblies.

SECTION 502
INSTALLATION

Revise as follows:

502.1 General. Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code*. Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300. Air source heat pump water heaters shall be installed in accordance with Section 506.

Add new text as follows:

SECTION 506
Heat Pump Water Heaters

506.1 Air-source heat pump water heaters (HPWH). Air-source heat pump water heaters (HPWH) shall comply with Sections 506.2. through 506.5.

506.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section 502.5.

506.3 Seismic Supports. Seismic supports shall comply with Section 502.4. Restraints shall not obstruct components specified in Section 506.2.

506.3.1 Unitary HPWH. Seismic restraints for unitary HPWHs shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

506.3.2 Split System HPWH. For split systems, the seismic restraints for the storage tank shall be in accordance with Section 506.3.1.

The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

506.4 Condensate Drains. Condensate drain lines from air source HPWHs shall be in accordance with Section 314.2.

506.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

506.5.1 Space volume method. Ventilation shall comply with the provisions Table 506.5.1.

TABLE 506.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

506.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table 506.5.1, additional ventilation shall be provided in accordance with Table 506.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table 506.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 506.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour) <1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150																		0
≥2,975 and <3,150																	0	80
≥2,800 and <2,975																0	80	100
≥2,625 and <2,800															0	80	100	120
≥2,450 and <2,625														0	80	100	120	140
≥2,275 and <2,450													0	80	100	120	140	160
≥2,100 and <2,275												0	80	100	120	140	160	180
≥1,925 and <2,100											0	80	100	120	140	160	180	200
≥1,750 and <1,925										0	80	100	120	140	160	180	200	220

≥1,575 and <1,750										0	80	100	120	140	160	180	200	220	240
≥1,400 and <1,575									0	80	100	120	140	160	180	200	220	240	260
≥1,225 and <1,400								0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225							0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050						0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875					0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700				0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525			0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080	
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260	
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260	

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

506.5.3 Ducted ventilation method. Where the location of the HPWH is in a space smaller than required in Table 506.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table 506.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

506.5.4 New construction. Ventilation shall comply with the provisions in Sections 506.5.1, 506.5.2 and 506.5.3 for the 18,000 BTU per Hour capacity column in Tables 506.5.1 and 506.5.2. **Exception:** For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

Reason: The purpose of this proposal is to add an option to the plumbing code so that installers of heat pump water heaters (HPWH) have clear provisions in the chapterson Water Heaters regarding their proper installation. HPWH are water heaters, and most of the provisions regarding the installation of all water heaters apply. A key requirement that does not exist is that they need to be installed so that they operate in heat pump mode for the majority of their duty cycle.

For air source HPWH, the type of water heater discussed in this proposal, this means special attention must be paid to the air flow requirements. They need a source of "warm" air to extract energy and they need a sink for the cold air they discharge to be absorbed. The source and the sink need be matched. This can be challenging in cold climates.

To accommodate the energy exchange required by the source and the sink, the sizes of which depend on the capacity of the heat pump, there needs to be

1. A minimum volume of the space where the HPWH is installed. Energy exchange happens within that space.

2. Passive ventilation into an adjacent space if the space where the HPWH is located is not large enough. The volume of the two spaces must meet the minimum volume requirements for the HPWH's capacity. The two spaces must share a common pressure zone.

3. Ducted ventilation into an adjacent or remote space if the minimum volume or passive ventilation requirements cannot be me. The HPWH needs to be ducted to and from a location with the ability to support required energy exchange. When ducted, the remote terminals for the intake need to come from, and exhaust ducts to, the same pressure zone so that they do not adversely affect the performance of other mechanical systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

P54-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal is overly prescriptive and fails to coordinate with current manufacturer's instructions. This information should be located in the IMC. (14-0)

P54-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

WATER HEATER, HEAT PUMP, AIR SOURCE. A water heater that transfers thermal energy from one temperature level to another temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function. There are two types of air source heat pump water heaters: ~~A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:~~

1. Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.
2. Split systems where the heat pump and storage tank are separate assemblies.

Reason: The US Department of Energy (DOE) defines the various types of water heaters sold in the United States. It makes sense to align the definition in this code with the one provided by DOE.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change is to the definition. This has no impact on the cost to install this type of water heater.

Comment 2:

IPC: 502.1

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

502.1 General. Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code*. Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300. Electric air ~~Air~~ source heat pump water heaters shall be installed in accordance with Section 506.

Reason: The proposed change clarifies that the provisions apply to electric air source heat pump water heaters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifying that the provisions apply to electric air source heat pump water heaters does not increase the cost to comply with the provisions in the section.

Comment 3:

IPC: 506.1

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

506.1 Air-source heat pump water heaters (HPWH). Electric air~~Air~~ source heat pump water heaters (HPWH) shall comply with Sections 506.2. through 506.5.

Reason: The proposed change clarifies that the provisions apply to electric air source heat pump water heaters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifying that the provisions apply to electric air source heat pump water heaters does not increase the cost to comply with the provisions in the section.

Comment (CAH2)# 596

Comment 4:

IPC: 506.2

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

506.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section 502.5. Cold air discharged from HPWHs shall not blow on or otherwise affect the operation of the space conditioning thermostat.

Reason: I learned about this issue since the first Committee Action Hearing while in conversation with industry.

It is not appropriate for cold air discharged from the electric air source heat pump water heater to blow onto or otherwise affect the operation of the thermostat that regulates the indoor temperature of the building. In the winter, it will cause the space heating system to come on when the majority of the building is at the desired temperature. In the summer, it will cause the space cooling system to turn off when the majority of the building is not at the desired temperature. In the swing seasons, the thermostat will be confused.

The cold air can blow onto the thermostat. It can also cool the wall behind the thermostat. Either case can result in an inappropriate response from the space conditioning system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Comment (CAH2)# 598

Comment 5:

IPC: 506.5, 506.5.1, 506.5.1.1 (New), 506.5.1.2 (New), 506.5.1.3 (New), TABLE 506.5.1, 506.5.2, 506.5.2.1 (New), 506.5.2.2 (New), 506.5.2.3 (New), TABLE 506.5.2, 506.5.3, 506.5.3.1 (New), 506.5.4, 506.5.4.1 (New), 506.5.4.2 (New), 506.5.4.3 (New)

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

Revise as follows:

506.5 Air flow for water heating ~~Ventilation.~~ The ~~ventilation~~ airflow requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.4. Intake air shall come from, and exhaust air shall be discharged to the same pressure zone.Where installed inside a building, the ~~The~~ minimum dimensions for the location ~~spacevolume~~ where a unitary HPWH or the heat pump portion of a split system HPWH *i*s installed shall be 3.5 feet x 3.5 feet x 8 feet for each HPWH, ~~= 98 cubic feet~~, or the minimum dimensions required by the manufacturer, whichever is greater. Access and service space shall conform to the requirements of Section 306 of the *International Mechanical Code*.

506.5.1 Conditioned air ~~Space volume method.~~ Air-source HPWH shall be *listed* and *labeled* for use with conditioned air. ~~Ventilation shall comply with the provisions Table 506.5.1~~.

Add new text as follows:

506.5.1.1 Direct Access. HPWH shall be installed in spaces where the energy supplied by the heating and cooling system is equal to or greater than the capacity of the heat pump portion of the HPWH.

506.5.1.2 Indirect access. Where installed in an enclosed space with inadequate heat rate, the energy supplied by the heating and cooling system for the sum of the enclosed space and the adjacent conditioned space shall be equal to or greater than the capacity of the heat pump portion of the HPWH. Where installed in an enclosed space that has only indirect access to conditioned air, HPWH shall be installed in accordance with Section 506.5.3 or 506.5.4 as applicable.

506.5.1.3 Available energy. The energy supplied by the heating and cooling system shall be determined in accordance with Section 312 of the *International Mechanical Code*. Where the installation does not conform with the provisions in Sections 506.5.1.1 or 506.5.1.2 backup heating shall be provided.

Delete without substitution:

~~TABLE 506.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW~~

~~Heat Pump Capacity (BTU/Hour)~~	~~<1,000~~	~~≥1,000 and <2,000~~	~~≥2,000 and <3,000~~	~~≥3,000 and <4,000~~	~~≥4,000 and <5,000~~	~~≥5,000 and <6,000~~	~~≥6,000 and <7,000~~	~~≥7,000 and <8,000~~	~~≥8,000 and <9,000~~	~~≥9,000 and <10,000~~	~~≥10,000 and <11,000~~	~~≥11,000 and <12,000~~	~~≥12,000 and <13,000~~	~~≥13,000 and <14,000~~	~~≥14,000 and <15,000~~	~~≥15,000 and <16,000~~	~~≥16,000 and <17,000~~	~~≥17,000 and <18,000~~
~~Space Volume (cubic feet)~~	~~175~~	~~350~~	~~525~~	~~700~~	~~875~~	~~1,050~~	~~1,225~~	~~1,400~~	~~1,575~~	~~1,750~~	~~1,925~~	~~2,100~~	~~2,275~~	~~2,450~~	~~2,625~~	~~2,800~~	~~2,975~~	~~3,150~~

~~For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW~~

Revise as follows:

506.5.2 Unconditioned and outdoor air ~~Passive ventilation method.~~ Where installed to utilize unconditioned or outdoor air, air-source unitary HPWH and split system HPWH shall be *listed* and *labeled* for use with outdoor air based on the climate zone where the HPWH is being installed. Unless the HPWH are *listed* and *labeled* for use with outdoor air, backup heating is required.~~Where the location of the HPWH is in a space smaller than required in Table 506.5.1, additional ventilation shall be provided in accordance with Table 506.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table 506.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.~~

Add new text as follows:

506.5.2.1 Direct access. The heat pump portion of the HPWH shall be provided with direct access to unconditioned or outdoor air and installed in accordance with manufacturer's instructions.

506.5.2.2 Indirect access. Where installed in an enclosed space that has only indirect access to unconditioned air or outdoor air, HPWH shall be installed in accordance with Section 506.5.3 or 506.5.4 as applicable, or backup heating shall be provided.

506.5.2.3 Available energy. The energy supplied to unconditioned spaces shall be determined in accordance with Section 312 of the *International Mechanical Code*. Where the energy supplied to the unconditioned space is not equal to or greater than the capacity of the heat pump portion of the HPWH, backup heating shall be provided.

Delete without substitution:

~~TABLE 506.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH~~

~~Space Volume (cubic feet)~~	~~Heat Pump Capacity (BTU/Hour)~~																			
	~~<1,000~~	~~≥1,000 and <2,000~~	~~≥2,000 and <3,000~~	~~≥3,000 and <4,000~~	~~≥4,000 and <5,000~~	~~≥5,000 and <6,000~~	~~≥6,000 and <7,000~~	~~≥7,000 and <8,000~~	~~≥8,000 and <9,000~~	~~≥9,000 and <10,000~~	~~≥10,000 and <11,000~~	~~≥11,000 and <12,000~~	~~≥12,000 and <13,000~~	~~≥13,000 and <14,000~~	~~≥14,000 and <15,000~~	~~≥15,000 and <16,000~~	~~≥16,000 and <17,000~~	~~≥17,000 and <18,000~~	
~~≥3,150~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~			~~0~~
~~≥2,975 and <3,150~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~			~~0~~	~~80~~
~~≥2,800 and <2,975~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	
~~≥2,625 and <2,800~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	
~~≥2,450 and <2,625~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	
~~≥2,275 and <2,450~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	
~~≥2,100 and <2,275~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~		
~~≥1,925 and <2,100~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~		
~~≥1,750 and <1,925~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~		
~~≥1,575 and <1,750~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~		
~~≥1,400 and <1,575~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~		
~~≥1,225 and <1,400~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~	~~280~~		
~~≥1,050 and <1,225~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~	~~280~~	~~300~~		
~~≥875 and <1,050~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~	~~280~~	~~300~~	~~320~~		
~~≥700 and <875~~	~~-~~	~~-~~	~~0~~	~~80~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~	~~280~~	~~300~~	~~320~~	~~340~~		
~~≥525 and <700~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	~~260~~	~~280~~	~~300~~	~~320~~	~~340~~	~~360~~			
~~≥350 and <525~~	~~0~~	~~120~~	~~160~~	~~200~~	~~240~~	~~280~~	~~320~~	~~360~~	~~400~~	~~440~~	~~480~~	~~520~~	~~560~~	~~600~~	~~640~~	~~680~~	~~720~~			

≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

Revise as follows:

506.5.3 Gravity airflow Ducted ventilation method. Gravity airflow shall be sized to provide not less than 75 square inches of free area per 100 watts of compressor, fan, and control power, or the minimum total free area as determined by the manufacturer, whichever is greater, inclusive of all HPWH installed in the enclosed space.

Where the location of the HPWH is in a space smaller than required in Table 506.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table 506.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

Add new text as follows:

506.5.3.1 Louvers and openings. The enclosed space shall be connected to the adjacent space using fully louvered doors or two openings of equal area, one located within 12 inches from the enclosure top and one located within 12 inches from the enclosure bottom. Louvers and grilles shall be fixed in the open position. Louvered doors and openings shall be permitted to be combined to meet the free area.

Revise as follows:

506.5.4 Forced airflow New construction. Forced airflow shall be sized to provide not less than 60 cfm per 100 watts of compressor, fan, and control power, or the minimum duct diameter as determined by the manufacturer, whichever is greater, inclusive of all HPWH installed in the enclosed space. Ventilation shall comply with the provisions in Sections 506.5.1, 506.5.2 and 506.5.3 for the 18,000 BTU per Hour capacity column in Tables 506.5.1 and 506.5.2.

Exception: For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

Add new text as follows:

506.5.4.1 Ducts. Ducts that transfer air between conditioned and unconditioned space shall be insulated to not less than R-6. Where duct termination points are close together, they shall be directed away from each other.

506.5.4.2 Combined gravity and forced airflow. Intake and exhaust air shall be permitted to be ducted, or to use gravity airflow for either the intake or the exhaust. The openings for gravity airflow shall not be less than half the area required in Section 506.5.3.

Add new text as follows:

506.5.4.3 Fan assist. Where the fan included with the HPWH cannot deliver the minimum airflow, a transfer fan or inline fan shall be installed to meet or exceed the minimum airflow.

Reason: Introduction
This public comment is intended to improve the original proposal to include the minimum installation requirements for electric air-source heat pump water heaters into the plumbing code.

Since submitting the proposal in January and listening to comments at the Committee Action Hearing in April, I have been communicating with manufacturers and others working with these water heaters to clarify, refine and simplify the installation requirements. The overall public comment proposes minor revisions to a few sections. Most of the sections included in the original proposal remain.

Based on the feedback from the CAH comments and ongoing discussions with industry, the focus of this public comment is on the ventilation provisions related to ensuring that there is enough sensible air flow for the air-source heat pump water heaters to operate as heat pumps. Air flow is everything, having enough air flow is critical to the real-world performance of air source heat pump water heaters.

The space volume provisions allowing the installation of air source heat pump water heaters in an enclosed space that only can access new energy via conduction through the surfaces of the enclosure should be removed. As discussed below, such enclosed spaces limit the amount of hot water that can be made each day in heat pump mode. Additionally, future make and model HPWHs will likely have more powerful compressors that can extract more heat from the surrounding air. Thus, if HPWHs are allowed to be installed in enclosed spaces, future makes and models will not be able to operate at their rated performance level when installed into the enclosed space designed for today's HPWHs.

The provisions that explain how to provide air via passive or ducted ventilation have been simplified.

- For passive ventilation, the minimum net free area is proposed to be 75 square inches per 100 watts of compressor, fan, and control power.
- For ducted ventilation, the minimum air flow rate is proposed to be 60 cubic feet per minute (CFM) per 100 watts of compressor, fan, and control power.
- The derivation of these values is discussed below.

Table of Contents

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **IPC-IRCP Reason Statement v1.docx**
  https://www.cdpaccess.com/comment/605/32899/files/download/8051/

Comment (CAH2)# 605

Comment 6:

IPC: 506.5, 506.5.5 (New)

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee

(AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

506.5 Air flow for water heating ~~Ventilation.~~ ~~The ventilation requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.~~

The airflow requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.5. Intake air shall come from, and exhaust air shall be discharged to the same pressure zone. Where installed inside a building, the minimum dimensions for the location where a unitary HPWH or the heat pump portion of a split system HPWH is installed shall be 3.5 feet x 3.5 feet x 8 feet for each HPWH, or the minimum dimensions required by the manufacturer, whichever is greater. Access and service space shall conform to the requirements of Section 306 of the *International Mechanical Code*.

Add new text as follows:

506.5.5 New water heater installations. Where the installation is not a replacement for an existing water heater, and the HPWH is installed in an enclosed space that has only indirect access to air in accordance with Sections 506.5.1 and 506.5.2 intake and exhaust airflow shall be provided for a HPWH with not less than 1,500 watts of compressor, fan, and control power in accordance with Sections 506.5.3 and 506.5.4.

Reason: This proposal specifies that, for new water heating installations, in locations with indirect access to a source of "warm" air, the airflow for the intake and exhaust shall be installed for a HPWH with the same heat rates as a typical electric resistance water heater (4,500 Watts, 240VAC. It does not specify that the HPWH that is being installed be that large. However, if the HPWH that is being installed is larger than 1500 watts, the airflow must match the needs for the larger heat pump.

Since about 45 percent of the country has an electric resistance water heater, they will be able to get the same recovery time with the HPWH. If the other 45 percent of the country that has gas water heaters installs the larger HPWH, it will only take twice as long as they are used to recover the daily hot water use, instead of the 7-8 times longer that current HPWH take.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Comment (CAH2)# 609

P54-24 Part II

IRC: SECTION 202 (New), CHAPTER 20, SECTION M2005, M2005.1, P2805 (New), P2805.1 (New), P2805.2 (New), P2805.3 (New), P2805.3.1 (New), P2805.3.2 (New), P2805.4 (New), P2805.5 (New), P2805.5.1 (New), TABLE 2805.5.1 (New), P2805.5.2 (New), TABLE 2805.5.2 (New), P2805.5.3 (New), P2805.5.4 (New)

Proposed Change as Submitted

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Residential Code

Add new definition as follows:

Water Heater, Heat Pump, Air Source. A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:(1) Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.(2) Split systems where the heat pump and storage tank are separate assemblies.

CHAPTER 20
BOILERS AND WATER HEATERS

SECTION M2005
WATER HEATERS

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.2. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and ICC 900/SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523. Air source heat pump water heaters shall comply with the requirements in Section P2805.

Add new text as follows:

P2805
Heat Pump Water Heaters

P2805.1 Air-source HPWHs. Air-source heat pump water heaters (HPWH) shall comply with Section P2805.2. through Section P2805.5.

P2805.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section M1305.

P2805.3 Seismic bracing. Seismic bracing shall comply with Section P2801.8. Restraints shall not obstruct components specified in Section P2805.2.

P2805.3.1 Unitary HPWH. For unitary HPWHs seismic restraints shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

P2805.3.2 Split System HPWH. For split systems the seismic restraints for the storage tank shall be in accordance with Section P2805.3.1. The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

P2805.4 Condensate drains. Condensate drain lines from air source HPWHs shall be in accordance with Section M1411.3.

P2805.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

P2805.5.1 Space volume method. Ventilation shall comply with the provisions Table P2805.5.1.

TABLE 2805.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

P2805.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, additional ventilation shall be provided in accordance with Table P2805.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table P2805.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 2805.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour) <1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
≥2,975 and <3,150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	80
≥2,800 and <2,975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	80	100
≥2,625 and <2,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	80	100	120
≥2,450 and <2,625	-	-	-	-	-	-	-	-	-	-	-	-	-	0	80	100	120	140
≥2,275 and <2,450	-	-	-	-	-	-	-	-	-	-	-	-	0	80	100	120	140	160
≥2,100 and <2,275	-	-	-	-	-	-	-	-	-	-	-	0	80	100	120	140	160	180
≥1,925 and <2,100	-	-	-	-	-	-	-	-	-	-	0	80	100	120	140	160	180	200
≥1,750 and <1,925	-	-	-	-	-	-	-	-	-	0	80	100	120	140	160	180	200	220
≥1,575 and <1,750	-	-	-	-	-	-	-	-	0	80	100	120	140	160	180	200	220	240

≥1,400 and <1,575									0	80	100	120	140	160	180	200	220	240	260
≥1,225 and <1,400								0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225							0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050						0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875					0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700				0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525			0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080	
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260	
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260	

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

P2805.5.3 Ducted ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table P2805.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

P2805.5.4 New construction. Ventilation shall comply with the provisions in Sections P2805.5.1, P2805.5.2 and P2805.5.3 for the 18,000 BTU per Hour capacity column in Tables P2805.5.1 and P2805.5.2. **Exception:** For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

Reason: The purpose of this proposal is to add an option to the plumbing code so that installers of heat pump water heaters (HPWH) have clear provisions in the chapterson Water Heaters regarding their proper installation. HPWH are water heaters, and most of the provisions regarding the installation of all water heaters apply. A key requirement that does not exist is that they need to be installed so that they operate in heat pump mode for the majority of their duty cycle.

For air source HPWH, the type of water heater discussed in this proposal, this means special attention must be paid to the air flow requirements. They need a source of "warm" air to extract energy and they need a sink for the cold air they discharge to be absorbed. The source and the sink need be matched. This can be challenging in cold climates.

To accommodate the energy exchange required by the source and the sink, the sizes of which depend on the capacity of the heat pump, there needs to be

1. A minimum volume of the space where the HPWH is installed. Energy exchange happens within that space.

2. Passive ventilation into an adjacent space if the space where the HPWH is located is not large enough. The volume of the two spaces must meet the minimum volume requirements for the HPWH's capacity. The two spaces must share a common pressure zone.

3. Ducted ventilation into an adjacent or remote space if the minimum volume or passive ventilation requirements cannot be me. The HPWH needs to be ducted to and from a location with the ability to support required energy exchange. When ducted, the remote terminals for the intake need to come from, and exhaust ducts to, the same pressure zone so that they do not adversely affect the performance of other mechanical systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

P54-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The heat pump water heater industry is in flux with changeover of refrigerants. Too difficult to come up with universal space/volume requirements for these units. The manufacturer's installation instructions for the specific unit must be followed. Also, complex tables as presented in the proposal are discouraged. (10-0)

P54-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: SECTION 202

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

Water Heater, Heat Pump, Air Source. A water heater that transfers thermal energy from one temperature level to another temperature level for the purpose of heating water, including all ancillary equipment such as fans, storage tanks, pumps, or controls necessary for the device to perform its function. There are two types of air source heat pump water heaters: ~~A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:~~
(1) Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.(2) Split systems where the heat pump and storage tank are separate assemblies.

Reason: The US Department of Energy (DOE) defines the various types of water heaters sold in the United States. It makes sense to align the definition in this code with the one provided by DOE.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed change is to the definition. This has no impact on the cost to install this type of water heater.

Comment (CAH2)# 610

Comment 2:

IRC: CHAPTER 20, SECTION M2005, M2005.1

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

CHAPTER 20
BOILERS AND WATER HEATERS

SECTION M2005
WATER HEATERS

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.2. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and ICC 900/SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523. Electric air ~~Air~~ source heat pump water heaters shall comply with the requirements in Section M2005.3 and Section P2805.

Reason:
The proposed change clarifies that electric air source heat pump water heaters must also comply with the provisions for electric water heaters in Section M2005.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifying that the provisions apply to electric air source heat pump water heaters and that these water heaters must also comply with the provisions for any electric water heater does not increase the cost to comply with the provisions in the section.

Comment (CAH2)# 611

Comment 3:

IRC: P2805, P2805.1

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

P2805

Heat Pump Water Heaters

Revise as follows:

P2805.1 Air-source HPWHs. ~~Air~~ Electric air-source heat pump water heaters (HPWH) shall comply with Section P2805.2. through Section P2805.5.

Reason: The proposed change clarifies that the provisions apply to electric air source heat pump water heaters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarifying that the provisions apply to electric air source heat pump water heaters does not increase the cost to comply with the provisions in the section.

Comment (CAH2)# 612

Comment 4:

IRC: P2805.2

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

P2805.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section M1305.
Cold air discharged from HPWHs shall not blow on or otherwise affect the operation of the space conditioning thermostat.

Reason: I learned about this issue since the first Committee Action Hearing while in conversation with industry.

It is not appropriate for cold air discharged from the electric air source heat pump water heater to blow onto or otherwise affect the operation of the thermostat that regulates the indoor temperature of the building. In the winter, it will cause the space heating system to come on when the majority of the building is at the desired temperature. In the summer, it will cause the space cooling system to turn off when the majority of the building is not at the desired temperature. In the swing seasons, the thermostat will be confused.

The cold air can blow onto the thermostat. It can also cool the wall behind the thermostat. Either case can result in an inappropriate response from the space conditioning system.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Comment 5:

IRC: P2805.5, P2805.5.1, P2805.5.1.1 (New), P2805.5.1.2 (New), P2805.5.1.3 (New), TABLE 2805.5.1, P2805.5.2, P2805.5.2.1 (New), P2805.5.2.2 (New), P2805.5.2.3 (New), TABLE 2805.5.2, P2805.5.3, P2805.5.3.1 (New), P2805.5.4

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

P2805.5 Airflow for water heating ~~Ventilation.~~ The ~~ventilation~~ airflow requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.4 ~~2805.5.5.~~ Intake air shall come from, and exhaust air shall be discharged to the same pressure zone. Where installed inside a building, the ~~The~~ minimum dimensions for the location ~~space volume~~ where a unitary HPWH or the heat pump portion of a split system HPWH is installed shall be 3.5 feet x 3.5 feet x 8 feet for each HPWH ~~= 98 cubic feet~~, or the minimum dimensions required by the manufacturer, whichever are greater. Access and service space shall conform to the requirements of Section M1305.

P2805.5.1 Conditioned air ~~Space volume method.~~ Air-source HPWH shall be *listed* and *labeled* for use with conditioned air. ~~Ventilation shall comply with the provisions Table P2805.5.1.~~

Add new text as follows:

P2805.5.1.1 Direct access. HPWH shall be installed in spaces where the energy supplied by the heating and cooling system is equal to or greater than the capacity of the heat pump portion of the HPWH.

P2805.5.1.2 Indirect access. Where installed in an enclosed space with inadequate heat rate, the energy supplied by the heating and cooling system for the sum of the enclosed space and the adjacent conditioned space shall be equal to or greater than the capacity of the heat pump portion of the HPWH. Where installed in an enclosed space that has only indirect access to conditioned air, HPWH shall be installed in accordance with Section P2805.5.3 or P2805.5.4 as applicable.

P2805.5.1.3 Available energy. The energy supplied by the heating and cooling system shall be determined in accordance with Section M1305.Where the installation does not conform with the provisions in Sections P2805.5.1.1 or P2805.5.1.2 backup heating shall be provided.

Delete without substitution:

~~TABLE 2805.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW~~

~~Heat Pump Capacity (BTU/Hour)~~	~~<1,000~~	~~≥1,000 and <2,000~~	~~≥2,000 and <3,000~~	~~≥3,000 and <4,000~~	~~≥4,000 and <5,000~~	~~≥5,000 and <6,000~~	~~≥6,000 and <7,000~~	~~≥7,000 and <8,000~~	~~≥8,000 and <9,000~~	~~≥9,000 and <10,000~~	~~≥10,000 and <11,000~~	~~≥11,000 and <12,000~~	~~≥12,000 and <13,000~~	~~≥13,000 and <14,000~~	~~≥14,000 and <15,000~~	~~≥15,000 and <16,000~~	~~≥16,000 and <17,000~~	~~≥17,000 and <18,000~~
~~Space Volume (cubic feet)~~	~~175~~	~~350~~	~~525~~	~~700~~	~~875~~	~~1,050~~	~~1,225~~	~~1,400~~	~~1,575~~	~~1,750~~	~~1,925~~	~~2,100~~	~~2,275~~	~~2,450~~	~~2,625~~	~~2,800~~	~~2,975~~	~~3,150~~

~~For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW~~

Revise as follows:

P2805.5.2 Unconditioned and outdoor air ~~Passive ventilation method~~. Where installed to utilize unconditioned or outdoor air, air-source unitary HPWH and split system HPWH shall be *listed* and *labeled* for use with outdoor air based on the climate zone where the HPWH is being installed. Unless the HPWH are *listed* and *labeled* for use with outdoor air, backup heating is required.

~~Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, additional ventilation shall be provided in accordance with Table P2805.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table P2805.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.~~

Add new text as follows:

P2805.5.2.1 Direct access. The heat pump portion of the HPWH shall be provided with direct access to unconditioned or outdoor air and installed in accordance with manufacturer's instructions.

P2805.5.2.2 Indirect access. Where installed in an enclosed space that has only indirect access to unconditioned or outdoor air, HPWH shall be installed in accordance with Section P2805.5.3 or P2805.5.4 as applicable, or backup heating shall be provided.

P2805.5.2.3 Available energy. The energy supplied to unconditioned spaces shall be determined in accordance with Section M1305. Where the energy supplied to the unconditioned space is not equal to or greater than the capacity of the heat pump portion of the HPWH, backup heating shall be provided.

Delete without substitution:

~~TABLE 2805.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH~~

~~Space Volume (cubic feet)~~	~~Heat Pump Capacity (BTU/Hour)~~																		
	~~<1,000~~	~~≥1,000 and <2,000~~	~~≥2,000 and <3,000~~	~~≥3,000 and <4,000~~	~~≥4,000 and <5,000~~	~~≥5,000 and <6,000~~	~~≥6,000 and <7,000~~	~~≥7,000 and <8,000~~	~~≥8,000 and <9,000~~	~~≥9,000 and <10,000~~	~~≥10,000 and <11,000~~	~~≥11,000 and <12,000~~	~~≥12,000 and <13,000~~	~~≥13,000 and <14,000~~	~~≥14,000 and <15,000~~	~~≥15,000 and <16,000~~	~~≥16,000 and <17,000~~	~~≥17,000 and <18,000~~	
~~≥3,150~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~
~~≥2,975 and <3,150~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~
~~≥2,800 and <2,975~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~
~~≥2,625 and <2,800~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~
~~≥2,450 and <2,625~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	~~140~~
~~≥2,275 and <2,450~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~
~~≥2,100 and <2,275~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~		~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~
~~≥1,925 and <2,100~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	
~~≥1,750 and <1,925~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	
~~≥1,575 and <1,750~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~	~~80~~	~~100~~	~~120~~	~~140~~	~~160~~	~~180~~	~~200~~	~~220~~	~~240~~	

≥1,400 and <1,575	-	-	-	-	-	-	-		0	80	100	120	140	160	180	200	220	240	260		
≥1,225 and <1,400	-	-	-	-	-	-		0	80	100	120	140	160	180	200	220	240	260	280		
≥1,050 and <1,225	-	-	-	-	-		0	80	100	120	140	160	180	200	220	240	260	280	300		
≥875 and <1,050	-	-	-	-		0	80	80	120	140	160	180	200	220	240	260	280	300	320		
≥700 and <875	-	-	-		0	80	80	100	140	160	180	200	220	240	260	280	300	320	340		
≥525 and <700	-	-		0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360		
≥350 and <525	-		0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720		
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080			
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260			
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260			

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

Revise as follows:

P2805.5.3 Gravity airflow Ducted ventilation method. Gravity airflow shall be sized to provide not less than 75 square inches of free area per 100 watts of compressor, fan, and control power, or the minimum total free area as determined by the manufacturer, whichever is greater, inclusive of all HPWH installed in the enclosed space. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table P2805.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

Add new text as follows:

P2805.5.3.1 Louvers and openings. The enclosed space shall be connected to the adjacent space using fully louvered doors or two openings of equal area, one located within 12 inches from the enclosure top and one located within 12 inches from the enclosure bottom. Louvers and grilles shall be fixed in the open position. Louvered doors and openings shall be permitted to be combined to meet the free area.

Revise as follows:

P2805.5.4 New water heater installations New construction. Where the installation is not a replacement for an existing water heater, and the HPWH is installed in an enclosed space that has only indirect access to air in accordance with Sections 2805.5.1 and 2805.5.2 intake and exhaust airflow shall be provided for a HPWH with not less than 1,500 watts of compressor, fan, and control power in accordance with Sections 2805.5.3 and 2805.5.4.
Ventilation shall comply with the provisions in Sections P2805.5.1, P2805.5.2 and P2805.5.3 for the 18,000 BTU per Hour capacity column in Tables P2805.5.1 and P2805.5.2.

Exception: For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

Reason: Introduction This public comment is intended to improve the original proposal to include the minimum installation requirements

for electric air-source heat pump water heaters into the plumbing code.

Since submitting the proposal in January and listening to comments at the Committee Action Hearing in April, I have been communicating with manufacturers and others working with these water heaters to clarify, refine and simplify the installation requirements. The overall public comment proposes minor revisions to a few sections. Most of the sections included in the original proposal remain.

Based on the feedback from the CAH comments and ongoing discussions with industry, the focus of this public comment is on the ventilation provisions related to ensuring that there is enough sensible air flow for the air-source heat pump water heaters to operate as heat pumps. Air flow is everything, having enough air flow is critical to the real-world performance of air source heat pump water heaters.

The space volume provisions allowing the installation of air source heat pump water heaters in an enclosed space that only can access new energy via conduction through the surfaces of the enclosure should be removed. As discussed below, such enclosed spaces limit the amount of hot water that can be made each day in heat pump mode. Additionally, future make and model HPWHs will likely have more powerful compressors that can extract more heat from the surrounding air. Thus, if HPWHs are allowed to be installed in enclosed spaces, future makes and models will not be able to operate at their rated performance level when installed into the enclosed space designed for today's HPWHs.
The provisions that explain how to provide air via passive or ducted ventilation have been simplified.

- For passive ventilation, the minimum net free area is proposed to be 75 square inches per 100 watts of compressor, fan, and control power.
- For ducted ventilation, the minimum air flow rate is proposed to be 60 cubic feet per minute (CFM) per 100 watts of compressor, fan, and control power.
- The derivation of these values is discussed below.

Table of Contents

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Attached Files

- **IPC-IRCP Reason Statement v1.docx**
  https://www.cdpaccess.com/comment/614/32901/files/download/8056/

Comment (CAH2)# 614

Comment 6:

IRC: P2805, P2805.5, P2805.5.5 (New)

Proponents: Gary Klein, Gary Klein and Associates, Inc., Self (gary@garykleinassociates.com) requests As Modified by Committee

(AMC2)

Modify as follows:

2024 International Residential Code

P2805
Heat Pump Water Heaters

Revise as follows:

P2805.5 Air flow for water heating ~~Ventilation.~~ ~~The ventilation requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.~~ The airflow requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.5. Intake air shall come from, and exhaust air shall be discharged to the same pressure zone. Where installed inside a building, the minimum dimensions for the location where a unitary HPWH or the heat pump portion of a split system HPWH is installed shall be 3.5 feet x 3.5 feet x 8 feet for each HPWH, or the minimum dimensions required by the manufacturer, whichever are greater. Access and service space shall conform to the requirements of Section M1305.

Add new text as follows:

P2805.5.5 New water heater installations. Where the installation is not a replacement for an existing water heater, and the HPWH is installed in an enclosed space that has only indirect access to air in accordance with SectionsP2805.5.1 and P2805.5.2, intake and exhaust airflow shall be provided for a HPWH with not less than 1,500 watts of compressor, fan, and control power in accordance with Sections P2805.5.3 and P2805.5.4.

Reason: This proposal specifies that, for new water heating installations, in locations with indirect access to a source of "warm" air, the airflow for the intake and exhaust shall be installed for a HPWH with at least the same heat rates as aa typical electric resistance water heater (4,500 Watts, 240VAC). It does not specify that the HPWH that is being installed be that large. However, if the HPWH that is being installed is larger than 1500 watts, the airflow must match the needs for the larger heat pump. Since about 45 percent of the country has an electric resistance water heater, they will be able to get the same recovery time with the HPWH. If the other 45 percent of the country that has gas water heaters installs the larger HPWH, it will only take twice as long as they are used to recover the daily hot water use, instead of the 7-8 times longer that current HPWH take.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a revision to provisions for a new section in the code that has not yet been adopted. The overall proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

Comment (CAH2)# 615

P55-24

IPC: 502.11 (New)

Proposed Change as Submitted

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

502.11 Hot water Generators, Heat Exchangers, Pre-heaters, Solar water heaters. Hot water generators, heat exchangers, pre-heaters, and solar water heaters that utilize heat exchangers to heat or pre-heat domestic hot water shall have a temperature-actuated mixing valve complying with ASSE 1017 located downstream of any hot water generators, heat exchangers, pre-heaters, or solar water heaters to limit and control the water temperature supplied to the potable hot water distribution system to a stable, temperature. The potability of the water shall be maintained throughout the domestic hot water distribution system. Requirements for the heat source piping systems shall be in accordance with the International Mechanical Code.

Reason: Heat exchangers used as pre-heaters or hot water generators have the ability to overheat the domestic hot water when steam or heating hot water valves stick open or when flue gasses are extremely hot. This code change assures that a temperature actuated mixing valve will mix the hot water downstream of the device to a stable and desired temperature. A specific temperature is not given, because in some applications the distribution temperature may need to be slightly above 140 F in order to keep the circulated return above a Legionella bacteria growth temperature in larger buildings with significant heat loss in the system. Having the mixing valve downstream of these heat exchangers and HW generators can control the temperature when the heat recovery or pre-heater system heats the water well beyond the desired hot water system temperature.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This will slightly increase the cost of construction, but adds a significant level of safety.

The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost with a labor rate of $95/hr can start at $183.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will save lives for as little as $183.00 on smaller systems and up to a few thousand dollars on larger systems. The value of this safety device is cheap compared to the increase in safety. This code change is needed to provide a safe hot water distribution system. The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost starts at about $183 for Water heaters up to 80 gallons or a maximum of gpm.

For larger systems, Bronze Thermostatic Mixing Valves 1” in size cost is about $100.00 to $300.00; Bronze Tempering Valves 3" in size cost about $2,400.00 to $3,925.00.

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Estimated Life Cycle Cost Impact:

This cost is much less than the cost of a burn injury which can reach millions of dollars in medical costs, and affect entire families who have to help care for burn victims. The physical, emotional, phycological and ongoing medical costs can be immense. Then add any litigation costs associated with litigation. Insurance companies should support this as a safer installation and a total reduction in overall medical and liability costs.
When a facility has an unsafe hot water system (Without temperature controls to prevent overheating conditions) injuries and deaths can occur. injuries include costs for medical treatment which includes burn care, debridement to scrape off dead tissue still attached to the body, skin grafting to cover burned areas with skin from the burn victim to prevent rejection issues, Ongoing surgeries to splice in skin as

the body grows, because the scar tissue does not grow or have elasticity. Additional medical costs associated with related medical conditions, psychological counseling, etc. Another cost not accounted for is the Litigation cost associated with a burn injury.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The average size of a cold water make-up valve in an institutional building is about 3 inches in size.

In my experience dealing with scald litigation, the judge and jury awards for scald cases have included costs to cover medical expenses, and ongoing medical equipment, assistance and treatments including punitive damages totaling in excess of 16 million dollars for one incident at a facility that had hot water systems that were not safely designed, controlled and maintained and caused burn injuries. According to Internet research, In Western countries and other democracies, estimates for the value of a statistical life typically range from $1 million US dollars to $10 million US Dollars; for example, the United States Federal Emergency Management Agency (FEMA) estimated the value of a statistical life at $7.5 million US Dollars in 2020.
The cost of a valve is far less expensive than the injury, pain, suffering, Medical and physical therapy expenses, and litigation expenses. Or the emotional issues from a serious burns or loss of life from a scald injury.

P55-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There is a debate that there could be another valve in this language. The language is very broad. The potability of water was stated and the committee was not sure how that fits into this section. (12-1)

P55-24

Individual Consideration Agenda

Comment 1:

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com) requests As Submitted

Reason: Heat exchangers used as pre-heaters or hot water generators have the ability to overheat the domestic hot water when steam or heating hot water valves stick open or when flue gasses are extremely hot.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 779

P59-24

IPC: 504.6

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank <u>where the water heater or storage tank is not elevated off of the floor</u>, to a waste receptor<u>,</u> or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: When water heaters are elevated off the floor, discharging to the pan can create splashing that will result in scalding if persons are standing near the water heater or below the water heater. This potential would violate item #6 of this section.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only to ensure that people are not put at risk by ensuring users of the code understand the section and how it should be applied.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: What is the elevation where there is concern about personal injury? (14-0)

P59-24

Individual Consideration Agenda

Comment 1:

IPC: 504.6

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Submitted

Reason: When water heaters are elevated off the floor, discharging to the pan can create splashing that will result in scalding if persons are standing near the water heater or below the water heater. This potential would violate item #6 of this section. To address some particular questions asked during CAH #1, specifically that note # 6 of the section already covers this, I would like to reference the 2021 IPC Commentary -

The relief valve discharge pipe must terminate not more than 6 inches (152 mm) but not less than two times the pipe diameter above the floor surface or a waste receptor (including a floor drain) in order to prevent hot water discharge from being directed onto a building occupant

[see Commentary Figure 504.6(1)]. The relief valve discharge pipe is also allowed to discharge to the pan serving the water heater or hot water storage tank [see Commentary Figure 504.6(2)]. For termination points to the floor, the floor must be a suitable location (e.g., garage floor that slopes toward a garage door for vehicle entry). Otherwise, a floor drain or waste receptor must be provided to capture discharges from the discharge pipe. Note that the code only requires the air gap to be in the same room as the water heater. In other words, the floor drain or waste receptor could be located in another room or possibly another floor level. This allows for unique solutions for capturing discharges. For example, in some multilevel buildings where water heaters are nearly in the same location on each floor, a discharge collection piping system could be designed to direct all of the discharges to a single waste receptor on the lowest level [see Commentary Figure 504.6(3)] or to the outdoors. The code is silent as to the size/shape of capturing receptors at each water heater and the size of the common collection piping down to the lowest level.

Discharge of a relief valve to laundry trays/tubs, kitchen/utility sinks and shower floors are not suitable locations as this violates Item 6 of this code section.

Persons using the fixture could be injured by hot water and steam that could come from the pipe.

Code users often go to the commentary for assistance in interpreting code requirements. Even the commentary is silent as to how this applies, so in many instances the code and commentary do not provide clear direction on this matter.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 394

P60-24

IPC: 504.6

Proposed Change as Submitted

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants. Where the discharge termination point is not readily visible and observable, a leak detection monitoring device with alarm notification (and not automatic shut-off), or a building management system shall be required.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: Approval of this code change will allow design flexibility, and more importantly, provide for the allowance of leak detection technology to warn building occupants and managers of a problem with a safety device.

Current code language just requires visibility of the termination point, but if there is a significant discharge of the valve there may not be any awareness of the problem for an extended period. This can especially be a problem when a building is unoccupied and then significant flood damage can result.

This proposal does not intend to require the devices, just allow their use if the termination point is not visible. The allowance of leak detection technology makes for safer, smarter buildings.

Bibliography: Links date: 11-29-2023

https://www.homedepot.com/p/MOEN-Smart-Leak-Detectors-1-Pack-920-004/312855333

https://www.prowaterheatersupply.com/sentinel-hydrosolutions-leak-defense-system-lds-3-200.html

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Immediate Cost Impact Justification (methodology and variables):

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Life Cycle Cost Impact:

Life Cycle Cost: $0

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: $0

P60-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The added language is an oxymoron. The first sentence requires the end to be readily visible and the new sentence speaks to when the end is not readily visible. Use of parenthesis in code text is not appropriate. (14-0)

P60-24

Individual Consideration Agenda

Comment 1:

IPC: 504.6

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants. ~~Where the discharge termination point is not readily visible and observable, a leak detection monitoring device with alarm notification (and not automatic shut off), or a building management system shall be required.~~ and a leak detection or monitoring device with a visible or audible alarm, or a connection to a building management system, shall be installed when required by the local authority having jurisdiction.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: Revised proposal to address committee's concerns about removing the requirement for readily observable termination port.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The proposed modification does not change the immediate cost impact of the proposal, with the modification, as the modification does not add any additional materials or installation labor.

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Immediate Cost Impact Justification (methodology and variables):

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Comment (CAH2)# 773

P62-24 Part II

IRC: P2801.5.1, IAPMO Chapter 44 (New)

Proposed Change as Submitted

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

2024 International Residential Code

Revise as follows:

P2801.5.1 Pan size and drain. The pan shall be not less than $1^1/_2$ inches (38 mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an *indirect waste pipe* of not less than $^3/_4$ inch (19 mm) diameter or be equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak. Piping for safety pan drains shall be of those materials indicated in Table P2906.5. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation when equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761-USA

ANSI/CAN/IAPMO Z1349-2021 Devices for Detection, Monitoring or Control of Plumbing Systems

Reason: The pan and drainage piping are intended to relieve small leaks. Although it might be small, a leak should not occur and is the first sign of a possible pending catastrophic event with no indication to the owner of any possible problem, as it is typically out of sight. In other instances, it can be extremely onerous to provide piping to an approved location in existing construction.

These listed devices are approved as options in many jurisdictions across Texas, California and more. In come cases, they are required in lieu of a pan and/or drain. They are reliable and sense a minuscule bit of moisture (one drop) and immediately shut off the water supply to the specific appliance. There are multiple manufacturers and well over a million units have been installed. Many water heater manufacturers, such as Rheem and AO Smith, have already incorporated this leak sensing technology into the equipment. This provision will raise the level of safety and protection for installations without integral devices.

T**he first change above** provides an option, could be a less expensive installation in some cases, raises the level of safety, has the potential to reduce injuries and save millions of dollars in water damages to structures.

T**he second change above** provides a much higher level of safety and corrects a potential safety hazard. The original provision allows for a noncompliant (unsafe) installation to be replaced and remain noncompliant in perpetuity regardless of whether it is above an occupied space or any other potential unsafe location. If a leak occurs above an occupied space, the pan may collect and have no place to drain. This new addition would now require a replacement water heater to have a pan drain or have an integral device or an approved external device to shut off the water to the heater in the event of a leak.

The code should not incentivize substandard installations and provide exceptions for noncompliant unsafe conditions that could cause damage and bodily harm just because it was already done previously.

Sample Local Jurisdiction Code Language:

Fort Worth, Texas

Exception: When a water heater retrofit or replacement occurs on a slab foundation and the line cannot be discharged to an approved location the T& P discharge line can be piped to the water heater pan provided with all of the following:

1. the water heater when water is detected inside the pan;

2. A device is installed that will sound an audible alarm when water is detected inside the pan to alert the occupants that a leak has occurred.

Frisco Texas

P2801.9 Water heaters installed in attics or with living space below: Water heaters, other than tankless, when located in an attic space or a space located above living space, shall be equipped with a WAGS, Floodstop or other approved device to automatically shut off the water supply if a water leak is detected.**Exception:** Replacement water heaters that were permitted on or before December 31, 2013, shall not be required to be equipped with an automatic Shut off device.

The following standard for the testing and certification of these devices has also beed proposed to the list of approved standards in the IRC and the IPC. **ANSI/CAN/IAPMO Z1349 Standard for Devices for Detection, Monitoring or Control of Plumbing Systems.**

This standard supports the proposals in the IRC and IPC to allow these devices as an additional option. It is an ANSI Standard

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

No Cost Impact. ($0)

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal only provides an additional option that could potentially reduce construction and installation costs and does not have a cost impact since it is merely an option.
This provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. Since it is **only another option, and not a required provision, it should never increase the cost of construction** if the decision is made on cost alone.The proposal corrects an unsafe provision and could also potentially save tens thousands of dollars per leak incident.

Estimated Life Cycle Cost Impact:

None

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN/IAPMO Z1349-21 *Standard for Devices for Detection, Monitoring or Control of Plumbing Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P62-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There is a concern that if water is shut off to the water heater that the elements could burn out. (10-0)

P62-24 Part II

Individual Consideration Agenda

Comment 1:

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com) requests As Submitted

Reason: Proven protection of occupants and structures from water heater leaks should not be sacrificed to preserve an already damaged and potentially dangerous appliance. There has not been any data or reported issues in the millions of installations by multiple manufacturers. It was not also a concern to the technical committee members and industry stakeholders that developed the ANSI product safety standard for this product. Although only a hypothetical concern at this point, many installations are used for gas fired water heaters (without heating elements) so the pool of possible problems with elements is greatly reduced and a nonissue. Mineral build up, faulty wiring, and pockets of air (airlock) can cause damage not only to the heating element but can create leaks. An automatic shut off would not likely be the reason for an element burn-out. The safety device would only activate due to the presence of water or a leak. If a water heater is leaking, damage has most likely already occurred to the heater and components/elements. If the water heater is leaking, concern about an internal heating element or any other component will not improve the safety or reduce damage. Listed Automatic shut-offs prevent further damage, both in water claims, and structural damage. Please accept as originally submitted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 688

P67-24

IPC: 604.4, 604.4.1 (New), 604.4.2 (New), TABLE 604.4

Proposed Change as Submitted

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

604.4 Maximum flow and water consumption. The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4. ~~**Exceptions:**~~

1. ~~Blowout design water closets having a water consumption not greater than 3 1/2 gallons (13 L) per flushing cycle.~~
2. ~~Vegetable sprays.~~
3. ~~Clinical sinks having a water consumption not greater than 4 1/2 gallons (17 L) per flushing cycle.~~
4. ~~Service sinks.~~
5. ~~Emergency showers.~~

Add new text as follows:

604.4.1 Group wash fixtures. Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.

604.4.2 Emergency fixtures. The maximum flow rates in Table 604.4 shall not apply to emergency fixtures.

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Clinical sink	4.5 gallons per flushing cycle
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
~~Sink~~ Kitchen sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle
Water closet, blowout	3.5 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: This proposal is an alternative approach for addressing the exceptions currently listed in Section 604.4. Clinical sink and blowout water closets have been added to the table since there are water consumption requirements. These are not exceptions. The other change to the table is the addition of the word “kitchen” in front of sink faucet in Table 604.4. The Federal water conservation

requirements are very clear in listing kitchen faucets. The use of the term “sink faucets” has led to some of the confusion regarding what sinks are regulated for water conservation.

A new subsection is proposed for determining the water consumption use for group wash fixtures used as public lavatories. Section 419.1 lists a rim space to be classified as a lavatory. However, for water consumption applications, the spacing listed is not consistent with the use of the fixture. The manufacturers have allocated the water use for each 16 inches of rim space.

The other new subsection states that emergency fixtures, showers, eyewash, or facewash, are not regulated by Table 604.4. This is consistent with the Federal requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial. If one reviews the change, they will notice that there is no additional requirements for plumbing fixtures. The text is simplified into a table format for better understanding. Hence, this has no impact on the cost of construction.

P67-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proponent wanted to fix his proposal with a floor modification but it was ruled out of order. The proposal needs to come back with a public comment. (14-0)

P67-24

Individual Consideration Agenda

Comment 1:

IPC: 604.4.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

~~**604.4.1 Group wash fixtures.** Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.~~

Reason: During the first hearing, a modification was submitted to strike Section 604.4.1 Group wash fixtures. Everyone, including the proponent, was in agreement to strike this section as being inappropriate to add. Unfortunately, the modification was ruled out of order. Had the modification been accepted, in all likelihood this change would have been accepted.
Two changes were proposed to modify this section. The Committee was asked to decide which approach they liked the best. There

appeared to be complete agreement that P67-24 was preferred over P68-24. For that reason, a public comment is only being proposed to P67-24 with the requested modification.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change strikes a section originally proposed to be included. Therefore, there is no cost impact.

Comment (CAH2)# 242

P73-24 Part I

IPC: 604.8, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

604.8 Water pressure-reducing valve or regulator. Where water pressure within a building exceeds 80 psi (552 kPa) static, an *approved* water pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 with strainer shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static. **Exception:** Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Reason: There are currently 2 types of pressure reducing valves allowed in the plumbing code. The ASSE 1003 Water Pressure Reducing Valves for Potable Water Distribution Systems, a directing acting valve in sizes ½" through 4" and the AWWA C530 Pilot Operated Control Valve. The ASSE 1103 valve is as the title states, a pilot operated valve in sizes 1-1/2" through 60". AWWA C530 valves were approved in the 2024 code cycle to provide an approved pressure reducing valve larger than 4" for systems that have larger volume requirements.

The new ASSE Standard 1103 "Pilot Operated Water Pressure Reducing Valves for Potable Water" will allow the use of pilot operated pressure control valves that are specifically intended for potable water applications. As such the standard requires compliance with NSF 61 and NSF 372.

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve, potable water pressure controllers with a valve specifically intended for use in potable water systems.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P73-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The standard is still in draft form. (13-1)

P73-24 Part I

Individual Consideration Agenda

Comment 1:

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com) requests As Submitted

Reason: ASSE 1103 is officially published as an ANSI Standard

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 768

Comment 2:

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The ASSE 1103 Standard is now a Published Standard under ANSI

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

P73-24 Part II

IRC: P2903.3.2, ASSE Chapter 44 (New)

Proposed Change as Submitted

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Residential Code

Revise as follows:

P2903.3.2 Maximum pressure. The static water pressure shall be not greater than 80 psi (551 kPa). Where the *main* pressure exceeds 80 psi (551 kPa), an *approved* pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 shall be installed on the domestic water branch *main* or riser at the connection to the water service pipe.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Reason: The addition of the new ASSE Standard 1103 Pilot Operated Water Pressure Reducing Valves for Potable Water will allow system designers another option for valve selection, particularly when sizes than 3" are required. These types of valves are capable of maintaining tighter control of the set pressure. The standard also requires their compliance with NSF 61 and NSF 372 in applications where the water is intended for human consumption.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P73-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The standard is not complete. (10-0)

P73-24 Part II

Individual Consideration Agenda

Comment 1:

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com) requests As Submitted

Reason: ASSE 1103 is officially published as an ANSI Standard

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 769

Comment 2:

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com) requests As Submitted

Reason: The ASSE 1103 Standard is now a published ANSI Standard

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 686

P83-24

IPC: TABLE 608.1, 608.17.1.2, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Backflow preventer plumbing devices:			
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″ – $^1/_2$″	ASSE 1022
Backflow preventer for carbonated and non-carbonated beverage machines.	Low Hazard	Backpressure or backsiphonage Sizes 1/4″–1/2″	ASSE 1032
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–$^3/_4$″	ASSE 1012; CSA B64.3
Backflow preventer with intermediate atmospheric vent and pressure-reducing valve.	Low hazard	Backpressure or backsiphonage Sizes $^1/_2$″–$^3/_4$″	ASSE 1081
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–2″	ASSE 1024; CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes $^1/_2$″–1″	ASME A112.21.3; ASSE 1052; CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes $^1/_2$″, $^3/_4$″, 1″	ASME A112.21.3; ASSE 1011; CSA B64.2; CSA B64.2.1
Laboratory faucet backflow preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035; CSA B64.7
Pipe-applied atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes $^1/_8$″–8″	ASSE 1001; CSA B64.1.1
Vacuum breaker wall hydrants, frost-resistant, automatic-draining-type	High or low hazard	Low head backpressure or backsiphonage Sizes $^3/_4$″, 1″	ASME A112.21.3; ASSE 1019; CSA B64.2.2

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

   High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

   See Backsiphonage (Section 202, Backflow).

608.17.1.2 Coffee machines and noncarbonated drink dispensers. The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024, ASSE 1032, or protected by an *air gap*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/ANSI 1032-23 Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers

Reason: ASSE/ANSI 1032-2023 *"Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers"* has been published and the title was updated to include the approval for applications that

are carbonated and non-carbonated. The previous version of the standard did not include non-carbonated and was the basis for rejection in the last code cycle. ASSE technical committees reviewed the design and materials of the ASSE 1032 backflow preventors and verified that they exceed the requirements for non-carbonated applications. This title change will provide increased design flexibility and inclusion in the IPC will allow acceptance by AHJs.

Bibliography: Links date: 11-29-2023

Zurn 1022

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Zurn 1032

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve check valves specifically intended for use in potable water systems. Costs for the original purchase, installation and life cycle of the proposed additional valve are very similar to the currently approved check valve. These valves are small and are generally replaced versus being field repaired.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1032-23 *Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P83-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The word "carbonated" needs to be stricken from the new line in the table. (14-0)

P83-24

Individual Consideration Agenda

Comment 1:

IPC: TABLE 608.1

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com) requests As Modified by Committee (AMC2)

Modify as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Backflow preventer plumbing devices:			
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″– $^1/_2$″	ASSE 1022
Backflow preventer for ~~carbonated and~~ non-carbonated beverage machines.	Low Hazard	Backpressure or backsiphonage Sizes 1/4″–1/2″	ASSE 1032
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–$^3/_4$″	ASSE 1012; CSA B64.3
Backflow preventer with intermediate atmospheric vent and pressure-reducing valve.	Low hazard	Backpressure or backsiphonage Sizes $^1/_2$″–$^3/_4$″	ASSE 1081
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes $^1/_4$″–2″	ASSE 1024; CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes $^1/_2$″–1″	ASME A112.21.3; ASSE 1052; CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes $^1/_2$″, $^3/_4$″, 1″	ASME A112.21.3; ASSE 1011; CSA B64.2; CSA B64.2.1
Laboratory faucet backflow preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035; CSA B64.7
Pipe-applied atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes $^1/_8$″–8″	ASSE 1001; CSA B64.1.1
Vacuum breaker wall hydrants, frost-resistant, automatic-draining-type	High or low hazard	Low head backpressure or backsiphonage Sizes $^3/_4$″, 1″	ASME A112.21.3; ASSE 1019; CSA B64.2.2

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

   High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

   See Backsiphonage (Section 202, Backflow).

Reason: Removed the carbonated beverage dispensers application from Table 608.1 due to concern regarding the reaction of CO2 gases with copper piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

corrected the language of the original proposal to address the committee's concerns, no cost changes to the original proposal.

Comment (CAH2)# 771

P93-24

IPC: SECTION 609, 609.1, 609.3 (New), 609.3.1 (New), 609.3

Proposed Change as Submitted

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Plumbing Code

SECTION 609
HEALTH CARE PLUMBING

609.1 Scope. This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following *occupancies* : Group I-1, Group I-2, ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

Add new text as follows:

609.3 Water. Water shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

609.3.1 Hand-washing water. Hand-washing water shall be provided to all dedicated handwashing stations. Water with a temperature not less than 45 degrees F (13 C) and not greater than 85 F degrees (32 C) or not less than 105 degrees F (40 C) to 120 degrees F (49 C), shall be delivered from dedicated hand-washing stations. Water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Revise as follows:

~~**609.3**~~ **609.3.2 Hot water.** Other than at dedicated hand washing stations, *hot* ~~*Hot*~~ *water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

Reason: The purpose of this change is to allow for maximum amount of handwashing options in a hospital setting, while considering optimal operating performance of systems. In addition to the proven effectiveness of handwashing against COVID-19, other pathogens such as Legionella are a primary concern for healthcare facilities. Water systems are constantly being optimized to In addition, use of higher water temperature increases energy consumption, and therefore having alternate options for handwashing would be beneficial from an environmental standpoint. Even if ABHR is used, it is not recommended for use when hands are heavily soiled or greasy, also per the CDC (Show Me the Science – When & How to Use Hand Sanitizer in Community Settings | Handwashing | CDC). From that article, the “CDC recommends washing hands with soap and water whenever possible because handwashing reduces the amounts of all types of germs and chemicals on hands.”

Hospital water systems do not directly reflect outside weather conditions in terms of temperature. Systems generally receive water from municipal mains at about 45 degrees minimum. To combat pathogens such as Legionella, CDC recommendations are to maintain cold water temperature at approximately 68 degrees, based on standard ASHRAE 12-2020. This is achieved by simple circulation of the water through the interior system of the hospital, where indoor air temperatures are maintained. Systems heat water, and also chilled water, to operational temperatures, but water from the cold water tap is not extreme in temperature. This dispels the notion of the “Minnesota Effect,” which was a concern in the debate and discussion during the Committee Action Hearings on this code change.

Also, during proper handwashing, use of soap accounts for most of the 20 seconds recommended for hand scrubbing. Hands are only under the water briefly at the beginning, to rinse hands, and then at the end to rinse off the soap. Based on CDC observations, found at Frequent Questions About Hand Hygiene | Handwashing | CDC the effectiveness of the soap is not related to water temperature. Per the

CDC, on the topic of use of warm water or cold water for handwashing, “[u]se your preferred water temperature – cold or warm – to wash your hands. Warm and cold water remove the same number of germs from your hands. The water helps create soap lather that removes germs from your skin when you wash your hands. Water itself does not usually kill germs; to kill germs, water would need to be hot enough to scald your hands.” Other studies suggest that cold water handwashing is actually more effective than warm water handwashing, including elimination of a number of pathogens as noted in Quantifying the Effects of Water Temperature, Soap Volume, Lather Time, and Antimicrobial Soap as Variables in the Removal of Escherichia coli ATCC 11229 from Hands (https://meridian.allenpress.com/jfp/article/80/6/1022/200017/Quantifying-the-Effects-of-Water-Temperature-Soap). In brief, “the results of this study indicate that water temperature is not a critical factor for the removal of transient microorganisms from hands.”

Regarding data surrounding Legionella testing, ASHRAE 188-2017 requires a testing program to determine growth of Legionella at cooling towers and domestic water systems. The purpose for testing is to treat the water before the pathogen grows to lethal levels. In 2017, as noted in Legionellosis Report 2017 (pa.gov), the top jurisdictions had a total of 7,458 cases of Legionella. The monumental Legionnaires Disease outbreak of 1976 at the Bellevue Stratford Hotel in Philadelphia had 182 reported cases with 29 deaths, for a 15.9% death rate. There have been more recent outbreaks in 2017 at Lenox Hill Hospital in New York, and in relation to the Flint, MI water crisis in 2019. Water testing programs are instituted throughout the united states to avoid such a catastrophic result, so systems can be properly cleaned before they reach an outbreak level.The complexities of encouraging handwashing, while mitigating pathogens such as Legionella and COVID-19, are a balance that hospitals face regularly. This change to allow cold handwashing affords another tool to successfully create the safest environment possible.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Bibliography: 1. Carrico AR, Spoden M, Wallston KA, Vandenbergh MP. The Environmental Cost of Misinformation: Why the Recommendation to Use Elevated Temperatures for Handwashing is Problematic. Int J Consum Stud. 2013;37(4):433-441. doi:10.1111/ijcs.12012

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an option for hospitals for water temperature and will not change the requirements for construction of the dedicated handwashing stations or the piping.

Staff Analysis: The proposed standard is in the current edition of the code.

P93-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal is confusing and needs to be brought back at CAH2 with clearer language. (14-0)

Individual Consideration Agenda

Comment 1:

IPC: SECTION 609, 609.1, 609.3, 609.3.1, 609.3.2

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

SECTION 609
HEALTH CARE PLUMBING

609.1 Scope. This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following *occupancies* : Group I-1, Group I-2, ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

609.3 Water. Water shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

609.3.1 Hand-washing water. Hand-washing water shall be ~~provided to all~~ delivered from dedicated handwashing stations. Water ~~with a~~ temperature shall be either:

1. Cold water not ~~Not~~ less than 45 degrees F (13 C) and not greater than 85 F degrees (32 C)
2. ~~nor~~ Hot water not less than 105 degrees F (40 C) ~~to~~ and not greater 120 degrees F (49 C) ~~, shall be delivered from dedicated hand-washing stations~~.

Water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: Tempered water shall be permitted where the water management program has alternate control measures implemented to provide protection from waterborne pathogens. Tempered water shall be controlled in accordance with Section 607.1.2.

609.3.2 Hot water. Other than at lavatories and dedicated hand washing stations, *hot water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

Reason: Hand washing stations are clearly defined in healthcare facilities by Facility Guideline Institute (FGI). See the reason statement for the original proposal for the purpose of the original change.

The committee reason was that the language was confusing. The new section has been revised to be consistent with the language for lavatories in IPC Section 419.5. A list separated the options for water colder or hotter than tempered water for clarity.

> **419.5 Tempered water for public hand-washing facilities.** Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for customers, patrons and visitors. Tempered water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

The new exception is for location, such as Texas, where the municipal water comes in hotter than 85 degrees. Allowing for tempered

water to be treated instead of cooling or heating the water provides an additional option to address the spread of pathogens in water necessary in hospitals, and will save energy.

The definition of tempered water is as follows.

TEMPERED WATER. Water having a temperature range between 85°F (29°C) and 110°F (43°C).

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2024 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an option for hospitals for water temperature and will not change the requirements for construction of the dedicated handwashing stations or the piping.

Comment (CAH2)# 200

Comment 2:

IPC: 609.3, 609.3.1, 609.3.2, 609.3.2 (New)

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

609.3 Hot and tempered water ~~Water~~. *Hot* and *tempered water* ~~*Water*~~ shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

Delete without substitution:

~~**609.3.1 Hand-washing water.** Hand-washing water shall be provided to all dedicated handwashing stations. Water with a temperature not less than 45 degrees F (13 C) and not greater than 85 F degrees (32 C) or not less than 105 degrees F (40 C) to 120 degrees F (49 C), shall be delivered from dedicated hand-washing stations. Water shall be delivered through an approved water temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.~~

~~**609.3.2**~~ **609.3.1 Hot water.** ~~Other than at dedicated hand washing stations *hot.*~~ *Hot water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

Add new text as follows:

609.3.2 Tempered water. *Tempered water* shall be provided to all hand washing stations. *Tempered water* shall be controlled in accordance with Section 607.1.2.

Reason: It appeared that the intent of the original change was to allow the use of tempered water for hand washing stations. By adding the heading "water" there needed to be requirements for cold water to hospital fixtures, however, that does not appear. Therefore, the modification changes the section to "hot and tempered water." Thus, the two following sections only address special requirements for hospital and health care facilities.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is only an editorial change of the original proposal. The original proposal listed the cost impact as being editorial in nature.

Comment (CAH2)# 653

P95-24

IPC: 611.1, Table 611.1 (New), ASSE Chapter 15 (New), NSF Chapter 15 (New)

Proposed Change as Submitted

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

611.1 Design. Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, NSF 42, NSF 44, NSF 53 or NSF 62. Commercial and food service water treatment equipment shall comply with ASSE 1087. Table 611.1 shall be used to determine the applicable standards for the applications and uses for the requirements of this section.

Add new text as follows:

Table 611.1 Drinking Water Treatment Units

Application	Point of Use	Point of Entry
Aesthetic Contaminant Reduction Filters	NSF/ANSI 42 or CSA B483.1	NSF/ANSI 42 or CSA B483.1
Distillation Systems	NSF/ANSI 62 or CSA B483.1	NSF/ANSI 62 or CSA B483.1
Health Related Contaminant Reduction Filters	NSF/ANSI 53 or CSA B483.1	NSF/ANSI 53 or CSA B483.1
Reverse Osmosis	NSF/ANSI 58 or CSA B483.1	-
Ultraviolet Water Treatment	NSF/ANSI 55 or CSA B483.1	NSF/ANSI 55 or CSA B483.1
Water Softeners	-	Up to 1.25 in. inlet: NSF/ANSI 44, or CSA B483.1 greater than 1.25 in, inlet : ASSE 1087

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1087 - 2022	Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water

NSF

NSF International
789 N. Dixboro Road P.O. Box 130140
Ann Arbor, MI 48105

55 - 2022	Ultraviolet Microbiological Water Treatment Systems

Reason: The proposal to add this language and chart is to define what ASSE 1087 standard covers in regards to the other standards listed currently in this section and what they cover in the Code. The table also includes the applications, point of use and point of entry for each standard listed in this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These are optional items in a building and are not required. It is up to the Owner of the building to decide if they wish these or not.

Staff Analysis: A review of the standard proposed for inclusion in the code, NSF 55-2022 *Ultraviolet (UV) Water Treatment Systems* and ASSE 1087-2022 *Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P95-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proponent indicated that there are issues with ASSE 1087 and it is not complete. (14-0)

P95-24

Individual Consideration Agenda

Comment 1:

IPC: 611.1, Table 611.1, ASSE Chapter 15

Proponents: Jeremy Brown, NSF International, NSF International (brown@nsf.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

611.1 Design. Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, NSF/ANSI 42, NSF/ANSI 44, NSF/ANSI 53, NSF/ANSI 55 or NSF/ANSI 62. ~~Commercial and food service water treatment equipment shall comply with ASSE 1087.~~ Table 611.1 shall be used to determine the applicable standards for the applications and uses for the requirements of this section.

Table 611.1 Drinking Water Treatment Units

Application	Point of Use	Point of Entry
Aesthetic Contaminant Reduction Filters	NSF/ANSI 42 or CSA B483.1	NSF/ANSI 42 or CSA B483.1
Distillation Systems	NSF/ANSI 62 or CSA B483.1	NSF/ANSI 62 or CSA B483.1
Health Related Contaminant Reduction Filters	NSF/ANSI 53 or CSA B483.1	NSF/ANSI 53 or CSA B483.1
Reverse Osmosis	NSF/ANSI 58 or CSA B483.1	-
Ultraviolet Water Treatment	NSF/ANSI 55 or CSA B483.1	NSF/ANSI 55 or CSA B483.1

Water Softeners	-	~~Up to 1.25 in. inlet:~~ NSF/ANSI 44, or CSA B483.1 ~~greater than 1.25 in, inlet : ASSE 1087~~

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

~~1087 - 2022~~	~~Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water~~

Reason: This code change introduces a couple of standards, ASSE 1087 and NSF/ANSI 55. Since the appropriateness of ASSE 1087 is being disputed, this comment proposes to add only NSF/ANSI 55 for which there is no dispute. NSF/ANSI 55 establishes minimum structural, material safety and performance health claims for treatment systems that reduce microorganisms using UV radiation. This standard was originally published in 1991 and is the American National Standard for UV treatment technology. This standard is referenced by the other major model plumbing code in the US as well as several states. Notice I am also adding ANSI to the name of these NSF Standards which represents their proper names. A copy has been provided to the committee and the public can obtain a free copy for consideration of this code change by emailing brown@nsf.org.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding this standard only offers another option for water treatment but does not mandate the use of UV systems, therefore it does not add cost to construction.

Comment (CAH2)# 79

P97-24

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proposed Change as Submitted

Proponents: Abraham MURRA, Abraham Murra Consulting, Georg Fischer

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80	ASTM F441/F441M, CSA B181.2
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80	ASTM F441/F441M, CSA B181.2
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Chlorinated polyvinylchloride (CPVC), Schedule 80	ASTM F439, CSA B181.2
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

Reason: CPVC is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a piping material, thus giving users more options to choose from, without any cost impact because of the new alternative.

Staff Analysis: The proposed standards are in the current edition of the code.

P97-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proponent had floor modifications which were ruled out of order. The proposal should be brought back at CAH1 with corrections, (14-0)

P97-24

Individual Consideration Agenda

Comment 1:

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting (abraham.murra@outlook.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe[a], ~~Schedule 80~~	ASTM F441/F441M, CSA B181.2
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3

MATERIAL	STANDARD
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

a. For vacuum drainage piping systems only.

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe[a], ~~Schedule 80~~	ASTM F441/F441M, CSA B181.2
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

a. For vacuum drainage piping systems only.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Chlorinated polyvinylchloride (CPVC)[a], ~~Schedule 80~~	~~ASTM F439,~~ CSA B181.2
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

a. For vacuum drainage piping systems only

Reason: CPVC is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials. The comment on proposal P97-24 addresses the concerns of the IPC Committee at the CAH #1 as follows:

1. Removes “Schedule 80”, allowing pipe with different wall thicknesses to be used
2. Adds a use restriction indicating that CPVC is intended to be used only in vacuum drainage piping systems; and
3. Removes the reference to ASTM F439 in Table 702.4

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a material for drainage piping, AS AN OPTION, and therefore has no cost impact on the cost of construction.

Comment (CAH2)# 214

P99-24 Part I

IPC: 702.2, ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

702.2 Underground building sanitary drainage and vent pipe. Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D2321.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

D2321-20	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Reason: Every manufacturer of thermoplastic pipe has in their instruction a reference to the ASTM D 2321 standard for underground installations. The problem is that there is nothing in the code that also references this important standard except section 303.2. Inspectors do not necessarily have the time to read through every manufacturer's installation instructions during an inspection, however, if the installation standard was referenced in the code then the jurisdiction would be responsible for providing access to the standard for verification purposes.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will make it easier to ensure installation are in compliance with the manufacturer's requirements and should not technically have any impact on the cost of construction if the installers were following these requirements as they should have been.

P99-24 Part I

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (8-5)

P99-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: 702.2, ASTM Chapter 15

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Plumbing Code

702.2 Underground building sanitary drainage and vent pipe. Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2~~. Thermoplastic pipe and fittings~~ and shall be installed in accordance with this code or in accordance with ASTM D2321.

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

D2321-20	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Reason: PPFA supports this plastic pipe installation standard, especially for unusual soils and larger diameters of plastic piping, but for typical plumbing installations, in a Note in the standard, the standard simply refers users right back to the plumbing code requirements. It should be an option, and contains much that is useful, but it makes no sense to require obtaining the standard just to be sent back to the code in most circumstances. Worse if the note is not noticed and a simple installation is over complicated.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Making the standard an option would not alter costs, and would save the installer the cost of buying the standard in many cases.

Comment (CAH2)# 325

Comment 2:

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests Disapproved

Reason: If this proposal remains approved As Submitted it will create several conflicts within the IPC and further sets the stage for a circular work path that allows either the code regulations to prevail or maybe the new ASTM 2321-20 Standard's, it's just not clear.

IPC Section 306.2 already addresses any perceived problems with invoking the ASTM 2321-20 Standard provisions where required. It states that "where the manufacturers installation instructions are more restrictive than those prescribed by code the material shall be installed with the most restrictive requirements."

The referenced **ASTM 2321-20 Standard Scope, Section 1.1**, contains the statement that "it is "recommendations" for installation of buried thermoplastic pipe…." Not written in prescriptive mandatory language and therefore subjective in nature. In **Section 1.2, Note 3**, it references that "most plumbing codes and some building codes have provisions for the installation of underground "building drains and building sewers." See them for plumbing piping applications." thus creating previous circular path in any underground application without ever clearly determining which set of provisions prevails. It is simply not clear which provisions are more restrictive?

The proponent never offered up exactly how the current code is broken and how the addition of the referenced Standard fixes anything. Instead, the addition of this Standard creates a direct conflict with the following sections:

306.2 Trenching and bedding. This Section allows the trench bed to be the support for the piping.

ASTM D2321-20 Section 7.2.2 requires engineering and/or the trench have a minimum of 4 inches of bedding installed.

306.2.1 Overexcavation. This Section requires that when a trench is overexcavated that it shall be backfilled with compacted sand or fine gravel, in lifts not to exceed 6 inches, to the bottom of the pipe.

ASTM D2321-20 Section 7.2.4 requires the use the Table 3 of the Standard where multiple applications are referenced based on soil conditions.

306.2.2 Rock removal. This Section requires that when rock is encountered during excavation the rock shall be removed not less than 3 inches below the pipe bottom and backfilled with tamped sand up to the bottom of the pipe to provide uniform bearing.

ASTM D2321-20 Section 6.5 requires that when rock is encountered, excavate a minimum of 6 inches below the bottom of the pipe and replace with "proper embedment."

306.2.3 Soft load-bearing materials. This Section requires that when poor load bearing materials are encountered during excavation, the materials be removed not less than 2 pipe diameters below the bottom of pipe. The poor bearing material shall be replaced with fine gravel, crushed stone or a concrete foundation.

ASTM D2321-20 Section 7.2.2 requires the use the Table 3 of the Standard where multiple applications are referenced based on soil conditions. Or for severe conditions an engineer may require a "special foundation."

306.3 Backfilling. This Section requires that backfill, free from construction debris, rocks, broken concrete and frozen chunks, shall be placed in a maximum of 6-inch lifts and tamped in place until the pipe is covered by 12 inches of backfill. And goes further to once again reiterate that "in instances where the manufacturer's instructions for materials are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement."

ASTM D2321-20 Section 7.6 requires engineering or a minimum of 24 inches of cover or at least one pipe diameter, whichever is greater.

These IPC Sections are longstanding, time-tested methods to install underground piping and as stated earlier the proponent has failed to provide any evidence that the code is not working well to provide the best practices while maintaining its scope of "minimum standards." If enforcement of the existing Chapter 3 regulations is the problem, then adding more confusing provisions in Chapter 7 will not resolve the issue, it will just compound.

The location of the suggested additional Standard ASTM 2321-20 is misplaced in the incorrect Section. The Standard addresses trenching, bedding and backfilling and as previously identified the IPC currently has Chapter 3 General Regulations, Sections 306.1 Support of piping, 306.2 Trenching and bedding, 306.2.1 Overexcavation, 306.2.2 Rock removal 306.2.3 Soft load-bearing materials- 306.3 Backfilling that all adequately cover trenching, bedding and backfill.

The term "thermoplastic" is not defined in the ASTM 2321-20, IPC or referenced in any piping material Tables. So, it is unclear when this Standard is to be referenced and exactly under what type of material application?

The referenced Standard ASTM 2321-20 is based on soil classification and backfill material combinations. It could be easily interpreted that a geotechnical engineer will need to be involved for any and all underground installations no matter how large or small the project.

The referenced Standard ASTM 2321-20 requires the minimum trench width "shall be not less than the greater of either the pipe outside diameter plus 16 inches or the pipe outside diameter times 1.25, plus 12 inches." This creates a tremendous hardship for a hand-digging installations and eliminates the use of a 12" backhoe bucket, both of which have been used successfully for as long as the codes have been in existence. There is simply no technical justification for this extremely over cumbersome requirement.

The referenced Standard ASTM 2321-20 appears to be much more appropriate for larger piping installations, but it never states exactly what size, and if approved it will apply to any and all underground installations both inside and outside the structure. ASTM D 2321-20

Section 7.5 even talks about tamping in place the “haunching” material which is the material that is placed on the from the trench bottom alongside the piping up to the springline. This is just one clear example that would indicate its applicability to larger piping systems.

This has the appearance of an overburdensome regulation that unfairly targets a specific piping material. This begs the question, why would these same trenching, bedding and backfill requirements NOT be applicable to all piping materials the same way the requirements of Chapter 3 currently address them? For past decades, the minimum trenching, bedding and backfill provisions have been “material neutral.” Now with no technical justification the rules will become tremendously more weighted towards one piping material industry.

Lastly, is the cost impact statement. This proposal will in fact increase the cost of construction. Not just through the issues raised throughout this reason statement but the cost of the ASTM 2321-20 Standard itself needs to be factored into the cost impact on all installers, code officials, designers and users of the code.

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 33 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 145

P99-24 Part II

IRC: P3002.1, P3002.2, ASTM Chapter 44 (New)

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

2024 International Residential Code

Revise as follows:

P3002.1 Piping within buildings. Drain, waste and vent (DWV) piping in *buildings* shall be as indicated in Tables P3002.1(1) and P3002.1(2) except that galvanized wrought-iron or galvanized steel pipe shall not be used underground and shall be maintained not less than 6 inches (152 mm) above ground. Allowance shall be made for the thermal expansion and contraction of plastic piping. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.

P3002.2 Building sewer. *Building sewer* piping shall be as indicated in Table P3002.2 Forced main sewer piping shall conform to one of the standards for ABS plastic pipe, copper or copper-alloy tubing, PVC plastic pipe or pressure-rated pipe indicated in Table P3002.2. Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

D2321-20	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

Reason: Every manufacturer of thermoplastic pipe has in their instruction a reference to the ASTM D 2321 standard for underground installations. The problem is that there is nothing in the code that also references this important standard except section 303.2. Inspectors do not necessarily have the time to read through every manufacturer's installation instructions during an inspection, however, if the installation standard was referenced in the code then the jurisdiction would be responsible for providing access to the standard for verification purposes.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will make it easier to ensure installation are in compliance with the manufacturer's requirements and should not technically have any impact on the cost of construction if the installers were following these requirements as they should have been.

P99-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The ASTM standard is not appropriate for the application. The cost impact states editorial but in reality, there is a

substantial cost impact. (10-0)

P99-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: P3002.1, P3002.2, ASTM Chapter 44

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Submitted

Reason: Every manufacturer of thermoplastic pipe has in their installation instructions a reference to the ASTM D 2321 standard for underground installations. The problem is that there is nothing in the code that also references this important standard except section 303.2. Inspectors do not necessarily have the time to read through every manufacturer's installation instructions during an inspection, however, if the installation standard was referenced in the code then the jurisdiction would be responsible for providing access to the standard for verification purposes.

Regardless of the comments made by some installers at CAH #1, just because you have been doing something for years does not mean you have been doing it correctly.

Additionally, the same proposal was accepted for the IPC at CAH #1.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 403

P104-24 Part I

IPC: 714.3, 714.1

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

714.3 ~~Location~~ Installation. Backwater valves shall be installed so that *access* is provided to the working parts.

714.1 Sewage backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public *sewer,* such fixtures shall be protected by a backwater valve installed in the *building drain*, or horizontal *branch* serving such fixtures. ~~Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not discharge through a backwater valve.~~The backwater valve shall be of the normally open type.

~~**Exception:** In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not be prohibited from discharging through a backwater valve.~~**Exception:** Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.

Reason: The title of the section was improper to begin with, "Location", the entire section was referencing installation requirements. The remainder of the proposal is focused on the fact that most floor drains are installed as part of a combination waste and vent system, however, since most backwater valves are manufactured as normally closed backwater valves, this interrupts the pathway for venting in a combination waste and vent system. Additionally, a normally closed backwater valve poses a resistance to flow until a certain amount of flow is present to force the valve open. This results in slowing the flow below the desired flow rate and impedes the ability of the waste flow to scour the pipe as it flows. A normally open backwater valve will avoid both of these associated complications from backwater valves. Additionally, allowing normally closed backwater valves to be installed to serve an entire existing building results in restricting the ability of the sewer systems to use building DWV system to assist in providing a venting pathway to atmosphere. This results in less pathways and increased positive and/or negative pressures within the sewer network and ultimately can negatively impact the DWV system of surrounding buildings.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements and should technically result in lower overall maintenance costs.

P104-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disagrees with the removal of the sentence in Section714.1 because if a surcharge situation occurs then the surcharge will flood into the basement. (13-0)

P104-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: 714.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

714.1 Sewage backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public *sewer,* such fixtures shall be protected by a backwater valve installed in the *building drain*, or horizontal *branch* serving such fixtures. In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not be prohibited from discharging through a backwater valve. The backwater valve shall be of the normally open type.

Exception: Normally closed backwater valve installations for existing buildings shall not be prohibited. ~~Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.~~ Normally closed backwater valves shall be permitted provided that a venting method in accordance with Chapter 9 is used upstream of the backwater valve.

Reason: The title of the section was improper to begin with, "Location", the entire section was referencing installation requirements. The remainder of the proposal is focused on the fact that most floor drains are installed as part of a combination waste and vent system, however, since most backwater valves are manufactured as normally closed backwater valves, this interrupts the pathway for venting in a combination waste and vent system. Additionally, a normally closed backwater valve poses a resistance to flow until a certain amount of flow is present to force the valve open. This results in slowing the flow below the desired flow rate and impedes the ability of the waste flow to scour the pipe as it flows. A normally open backwater valve will avoid both of these associated complications from backwater valves. The exception for existing buildings has been moved into the body and exception that still allows for a normally closed backwater valve to be used is included in the exception portion.
These changes should address the concerns raised by the IPC Code Development Committee at CAH #1.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements, allows for additional products, and makes sure a proper venting method is provided where needed.

Comment (CAH2)# 406

P104-24 Part II

IRC: P3008.2

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3008.2 Allowable installations. Where plumbing fixtures are installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public sewer, ~~and~~ a backwater valve ~~is~~ shall be installed in the *building drain* or *horizontal branch* serving such fixtures. ~~, the~~ The backwater valve shall be of the normally open type.

Exception: Normally closed backwater valve installations for *existing buildings* shall not be prohibited. Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.

Reason: The title of the section was improper to begin with, "Location", the entire section was referencing installation requirements. The remainder of the proposal is focused on the fact that most floor drains are installed as part of a combination waste and vent system, however, since most backwater valves are manufactured as normally closed backwater valves, this interrupts the pathway for venting in a combination waste and vent system. Additionally, a normally closed backwater valve poses a resistance to flow until a certain amount of flow is present to force the valve open. This results in slowing the flow below the desired flow rate and impedes the ability of the waste flow to scour the pipe as it flows. A normally open backwater valve will avoid both of these associated complications from backwater valves. Additionally, allowing normally closed backwater valves to be installed to serve an entire existing building results in restricting the ability of the sewer systems to use building DWV system to assist in providing a venting pathway to atmosphere. This results in less pathways and increased positive and/or negative pressures within the sewer network and ultimately can negatively impact the DWV system of surrounding buildings.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements and should technically result in lower overall maintenance costs.

P104-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Proposal removes a viable option from the code. Would cause every horizontal branch to have a backwater valve. Cost impact would be significant. (10-0)

P104-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: P3008.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

P3008.2 Allowable installations. Where plumbing fixtures are installed on a floor with a finished floor elevation ~~above~~ below the elevation of the manhole cover of the next upstream manhole in the public *sewer,* a backwater valve shall be installed in the *building drain*, or horizontal *branch* serving such fixtures. In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not be prohibited from discharging through a backwater valve. The backwater valve shall be of the normally open type.

Exception: Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be permitted provided ~~with~~ that a venting method in accordance with one of the methods in Chapter 9 is used upstream of the backwater valve.

Reason: Though the code section does already require the preferrable method for providing backflow protection, normally open valves, the exception does not address the need to provide a normally closed backwater valve with a venting method upstream of the valve. Additionally, the portion dealing with existing buildings should be moved to the body and reserve the exception for allowing the use of normally closed backwater valves as long as a venting method is provided upstream as previously stated.

An additional small change was added to harmonize this text with the text in the IPC. In the first sentence the word above was changed to below in relation to the next upstream manhole as that was the intent all along.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements, it actually allows for additional products to be used as long as proper venting is provided upstream of the backwater valve.

Comment (CAH2)# 405

P105-24

IPC: 715.2, CSA Chapter 15 (New)

Proposed Change as Submitted

Proponents: Abraham MURRA, Abraham Murra Consulting, Jets Vacuum AS, Norway

2024 International Plumbing Code

Revise as follows:

715.2 System design. Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system shall be in accordance with CSA B45.13/IAPMO Z1700 and with the manufacturer's instructions. Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B45.13:19/IAPMO Z1700-2019	Vacuum waste-collection systems

Reason: Adding a reference to CSA B45.13/IAPMO Z1700 —a consensus standard that specifies requirements for materials, construction, performance testing, and markings— in the system design section of the IPC will standardize vacuum waste-collection systems. Mandating that such systems comply only with the manufacturer's instructions allows installation of substandard systems that do not benefit users or regulators.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding CSA B45.13/IAPMO Z1700 as a referenced standard to the IPC should not have a cost impact as major manufacturers of vacuum waste-collection systems are already listed to the standard.

P105-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The standard doesn't address all the items listed in the sentence. The proposal needs reworded to correct. (12-2)

P105-24

Individual Consideration Agenda

Comment 1:

IPC: 715.2

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

715.2 System design. Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions and shall comply with CSA B45.13/IAPMO Z1700. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system shall be in accordance with ~~CSA B45.13/IAPMO Z1700 and with~~ the manufacturer's instructions. Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.

Reason:
The comment on proposal P105-24 addresses the concern expressed by the IPC Committee by mandating compliance with CSA B45.13/IAPMO Z1700 in accordance with the scope of the standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding CSA B45.13/IAPMO Z1700 as a referenced standard to the IPC does not have a cost impact as major manufacturers of vacuum systems are listed to the standard.

Comment (CAH2)# 226

P106-24

IPC: 717.1, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General. This section shall govern the relining of existing *building sewers* and building drainage piping. Required Inspections shall be conducted by a ANSI/ASSE/IAPMO Series 28000 qualified inspector.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ANSI/ASSE/IAPMO Series 28000-Standard 28001-xx	Professional Qualifications Standard for Inspectors of CIPP (Cured-in-Place-Pipe) Rehabilitation of Building Sewer and Drain, Waste and Vent Piping Systems (DRAFT)

Reason: The new ANSI/ASSE/IAPMO Series 2800 standard assures that the inspector and inspection of piping using CIPP is done appropriately. Unfortunately, many inspectors are not knowledgeable concerning CIPP rehabilitation, and the necessary requirements demanded for proper installation and inspection. This requirement is necessary and needed in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Proper inspection is not only a cost built into the code but necessary to protect it's users ultimate health and safety.

P106-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The standard is not posted so we don't know what the qualifications for the inspectors will be. Everything is too vague yet. A better place for this requirement would be in Section 717.9. The proposal states that there is no cost impact but clearly there is. (14-0)

P106-24

Individual Consideration Agenda

Comment 1:

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com) requests As Submitted

Reason: The Committee denied the code change because of the standard still being under development. It is now completed and should be added to the code to assure that the inspector and the inspection of piping using CIPP is done appropriately.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 411

P107-24

IPC: 717.1

Proposed Change as Submitted

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General. This section shall govern the relining of existing *building sewers* and building drainage system piping.

Reason: The title and scope of both Secton 717 and 718 are for Building sewers and Building drains. Building drains can include sanitary and storm water. A more inclusive and proper scope for both 717 and 718 would be to use Drainage System piping instead of drainage piping which are both defined in Section 3 of the code. This would eliminate confusion and recognize all piping covered under the requirements of these Sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Just as my reason states: This code change simply clarifies current requirements in the code and would add no additional cost to installation and technology currently used in Section 717.

P107-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The additional word captures all that needs to be included. (13-1)

P107-24

Individual Consideration Agenda

Comment 1:

IPC: 717.1

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

717.1 General. This section shall govern the relining and rehabilitation of existing *building sewers* and building drainage system piping.

Reason: Editorial change for clarity and alignment with reference standards for cured-in-place pipe (CIPP) from Section 718 which is proposed and approved (CAH#1) to be moved to Section 717. The change is to add the term "rehabilitation" as CIPP is used to rehabilitate existing pipelines, and this is the term that is used within existing, new and proposed reference standards. Whereas, the term "relining" is not used in these standards. Confusion will be reduced by adding this term in the Section 717.1 General.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modification to this proposal simply edit the terminology slightly to better conform to industry and reference standards. The requirements are not changed by this modification.

Comment (CAH2)# 733

P108-24

IPC: 717.2

Proposed Change as Submitted

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.2 Applicability. The relining of existing *building sewers* and building drainage piping shall be limited to gravity drainage piping 2"~~4~~ inches (~~102~~50 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

Reason: CIPP in building drains is routinely used in sizes down to 2". The scope of ASTM F1216-22 governs the usage of CIPP down to 2".

Documentation is provided that shows the ability to routinely preserve flow capacity while increasing scouring velocities in sizes down to 2", with typical CIPP thicknesses. It is recognized that the DFU design capacity requires preservation. The nominal pipe size is not altered.

The provided flow analysis chart does not take into consideration the inherent conservatism of DFU design being based upon data from cast iron pipe collected in the 1930s. As far as actually maintaining the original design DFUs, all CIPP relined pipes should be compared to iron pipe flows as the basis of their original DFU design capacity. What is apparent, is that CIPP does not negatively alter nominal sizing nor DFU capacity at typical installed thicknesses. Scouring velocity also greatly improves, further helping to correct for minor flow issues in the existing piping.

Bibliography: ASTM F1216-22 Scope

"1.1 This practice describes the procedures for the reconstruction of pipelines and conduits (**2 in.** to 108 in. diameter) by the installation of a resin-impregnated, flexible tube which is inverted into the existing conduit by use of a hydrostatic head or air pressure."

NuFlow Flow Analysis Chart to be attached.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal merely expands the applicable size range down to 2" with the same comparative cost impacts as are typical of relining / rehabilitation for repair or replacement with Cured-in-Place Pipe (CIPP) versus exhume and replace with other piping materials, as already otherwise approved for use within Sections 717 and 718 of the Code.

This proposal to expand the size range down to 2" creates no significant cost impact alteration as compared to the considerations behind the existing code inclusion of CIPP.

Attached Files

- **TECH BRIEF - NuDrain Flow Analysis - 20201117 Rev Lvl 1.1.pdf**
  https://www.cdpaccess.com/proposal/10434/30667/files/download/4388/

P108-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The current code does not have ASTM F1216 so it would be premature to approve this proposal based on information from a standard that is not yet part of the code.. (13-1)

P108-24

Individual Consideration Agenda

Comment 1:

IPC: 717.2

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

717.2 Applicability. The relining of existing *building sewers* and building drainage system piping shall be limited to gravity drainage piping 3~~2"~~ inches (~~50~~80 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

Reason:

This proposal was denied by CAH1 due to ASTM F1216 not yet being a part of the code. Therefore, a change in the reasoning was made to a current reference standard ASTM F2561 which includes piping down to 3 inch diameter. CIPP is routinely used to rehabilitate building drainage system piping in sizes down to 3 inch diameter.

Bibliography: ASTM F2561 - Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner

*1. Scope**
1.1 This practice covers requirements and test methods for the reconstruction of a sewer service lateral pipe having an inner diameter of 3 to 12 in. (7.6 to 30.5 cm) and its connection to the main pipe having an inner diameter of 6 to 24 in. (15.2 to 61.0 cm) and up the lateral a maximum of 150 ft (46 m) without excavation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal expand the diameter of existing piping in which CIPP may be used in accordance with referenced standards.

Comment (CAH2)# 748

P110-24

IPC: 717.5

Proposed Change as Submitted

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.5 Prohibited applications. Where review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly or defects exist, that will not be corrected by relining, then relining shall not be permitted without correction of such defects prior to cured-in place-pipe relining. ~~The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, backgrade or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.~~

Reason: The deleted language is erroneous regarding the capabilities and limitations of CIPP and confusingly complicated. The revised opening language more appropriately covers the guidance required by AHJs to make informed decisions on when to prohibit the use of CIPP.

There seems to be the erroneous assumption that CIPP is only ever a "repair" option and not capable of being a "replacement" option. The industry consensus standards and their design equations (as found in the design appendix of ASTM F1216) provide for the use of CIPP as a structural replacement as well as a performance repair system.

The installation of CIPP as a "repair" in conjunction with the preparation of the existing pipe for relining can readily correct defects such as flow disruption by scaling or tuberculation (which can be mistaken for backgrade or insufficient slope) prior to cleaning. Although CIPP cannot correct significant line and grade issues, the improved flow characteristics (including the increased scouring velocity) frequently rectifies any sedimentation issues associated with minor bellies in piping. Properly designed in compliance with the IPC, CIPP does NOT reduce the nominal sizing, the original design flow capacity, or the original design DFU count.

CIPP can also reliably eliminate leakage and root penetration from failed joint seals and even function as "replacement" piping for missing sections of buried piping. CIPP can structurally "replace" pipe sections with "channel rot" and can also structurally "replace" pipes with missing pipe sections; there are also reliable methods to fill voids around the pipe wall while restoring the proper flow line for code compliance. Soil voiding in such smaller diameter CIPP applications is expected to fully reconsolidate within 2 to 3 years to restore proper soil support, with the CIPP structurally spanning the void in the interim.

Where existing pipe defects are capable of being corrected through pipe "replacement" with CIPP, there should be no reason to disallow a reviewed permit installation of certified and listed CIPP systems by a responsible, licensed contractor. The 2024 code language is unnecessarily restrictive.

Bibliography: The ASTM F1216 design appendix provides an industry consensus design approach for use of CIPP as a structural replacement for piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The clarifications are in regard to proper applicability for use as either "repair" or "replacement."

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There is a lot of work to do in this grouping of proposals [P109-P112]. Fixing defects in pipe is something that you are going to do any way, There needs to be more clarification. The proposal is removing reasons for the code official to not allow the work to take place. The proposal is making the situation worse instead of better. (14-0)

P110-24

Individual Consideration Agenda

Comment 1:

IPC: 717.5

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

717.5 Prohibited applications. Where review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly, obstructions have not been removed, or defects exist that prevent proper installation of the rehabilitation system, ~~that will not be corrected by relining, then~~ relining shall not be permitted until corrected or removed in accordance with this code.~~without correction of such defects prior to cured-in-place pipe relining.~~ Defects and obstructions include, but are not limited to, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support, collapsed or crushed pipe, and reductions in the cross-sectional area of more than 20% of the inside pipe diameter.

Reason: This proposal was denied by CAH1 citing the need for more clarification. The changes are made to align the code to reference and industry standards providing additional clarity with the addition of CIPP to section 717.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal provide additional information which through added clarity can prevent improper installations which could impact cost where removal or excavation of improper relining applications may be required.

Comment (CAH2)# 752

P111-24

IPC: 717.6, ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials. The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Cured-in-place-pipe reline materials shall comply with ASTM F1216, ASTM F1743, ASTM F2561, ASTM F2599 or ASTM F3541. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner
F3541-22	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Reason: The scope of Section 717 with its detailed guidance is clearly intended to include usage with Cured-in-Place Pipe (CIPP) reline materials. The Fold & Form PVC reline materials standards (ASTM F1871 & ASTM F1504) have never had a product certified and listed by ICC-ES and have exceptionally minimal usage in Building Sewer applications only.

This section needs to include the ASTM standards to which ICC-ES is actively certifying and listing CIPP systems to provide more thorough guidance to AHJs; currently, products are certified and listed to ASTM F1216-22 (with ICC required mandatory language) for inversion and ASTM F1743-22 (expected mandatory language revision in 2024 -- currently balloting) for pull-in-place CIPP.

We also propose that the recently passed standard of ASTM F3541-22 be included within this section. ASTM F3541 is for segmental relining by CIPP and closely reflects the actual installation practices utilized within Building Sewer and Building Drain applications. ASTM F3541 includes by reference the same performance property requirements of ASTM F1743 to which ICC-ES currently certifies CIPP systems.

We are also recommending the inclusion of ASTM F2599 (segmental CIPP lining by inversion with patented gaskets) and ASTM F2561 (utility sewer lateral to utility main connection CIPP lining with patented gaskets) that are currently included in the otherwise redundant (same title scope) Section 718. Note that no CIPP systems has ever been certified and listed for use to these standards. Any products applicable to ASTM F2599 or ASTM F2561 will also comply with the same performance property requirements of ASTM F1216 to which ICC-ES already certifies CIPP systems. As such, the inclusion of these proprietary standards is a bit redundant.

Bibliography: F1216-22 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743-24 (expected) [F1743-22] Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

ASTM F2561-20 Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner

ASTM F2599-22 Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner

ASTM F3541-22 Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only requests referencing standards of materials already otherwise governed by this Code section (thereby is editorial in nature or a clarification), and as such there is no new cost impact.

The addition of existing and newly referenced standards into Section 717 provides no significant cost impact alteration as compared to the existing costs impacts behind the existing code inclusion.

For those interested, we will further expound upon the comparative cost impacts between relining / rehabilitation with Cured-in-Place Pipe (CIPP) versus exhumation and replacement with other piping materials.

The unit costs of CIPP "materials" are typically about the same as other code approved piping alternatives. But depending upon the project scope and site conditions, the unit costs of CIPP "as constructed" are HIGHLY variable as compared to the alternative of exhuming existing piping and replacing with other code approved piping alternatives (refer to the attached project cost analysis documentation).

CIPP "project costs" are significantly driven by the site conditions (and the ancillary "costs" of facility operational disruption tend to also weigh into choosing relining / rehabilitation versus exhumation & replacement) rather than the piping materials cost differences. Hence, a more direct cost comparison to other piping materials' costs is not truly relevant or particularly useful.

So, we will explore how site conditions and operational disruptions create relevant "cost impacts" deserving of thoughtful consideration.

SITE CONDITIONS: Where surface structure restoration costs are exceptionally high, avoidance of such site restoration costs through the remote installation of CIPP (with limited site disruption) can provide significant project cost savings as compared to exhuming the existing piping and replacing with alternative code approved piping materials. The "ancillary" surface structure restoration costs associated with piping exhumation, removal, and replacement is frequently the primary driver of project cost differentials.

Exhumation and replacement can often negatively impact load bearing components of a structure resulting in exceptionally high restoration costs that can be avoided by pipe relining / rehabilitation with CIPP.

Relining / rehabilitation with CIPP can also greatly reduce site safety risks associated with exhumation and prospectively confined space entry. Exhumation and replacement can have environmental and health impacts such as disruption of encapsulated asbestos, lead paint or other hazardous materials, requiring high remediation and disposal costs, as well as subjecting workers and facility occupants to unnecessary risks. Relining / rehabilitation with CIPP can be leveraged to avoid such risks and costs.

Where surface structure restoration and/or remediation costs and risks are high, the higher materials, specialty labor, and equipment costs associated with CIPP installation are generally absorbed and frequently exceeded, resulting in the potential for significant cost savings with CIPP.

OPERATIONAL DISRUPTION & BROADER SOCIAL COSTS: In addition to direct construction costs and risks, the indirect costs and risks of operational disruption often weigh into any project "cost" comparison between a relining / rehabilitation installation with CIPP versus exhumation and replacement with other piping materials.

With facilities such as hospitals, jails, court houses, schools, etc. (even the Pentagon & White House on multiple occasions), the "social costs" of operational disruption from exhumation and replacement are frequently deemed to be entirely unacceptable. Relining / rehabilitation with CIPP can reduce the "social costs" to a more acceptable level.

Schools with emergency piping issues do not have the facility capacity and cannot afford the “social costs” to the community that would be caused by unscheduled shutting down of classrooms for extensive exhumation and replacement of piping during the school year. Jails and other government facilities often have security and operational concerns that are alleviated through remote pipe relining / rehabilitation with CIPP versus direct secure zone entry and disruption that is required for exhumation and replacement.

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube*, ASTM F1743-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)* and ASTM F2599-22 *Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner1,* ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

The proposed standard ASTM F2561 is in the current edition of the code.

Attached Files

- **Value Engineering Considerations.pdf**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4716/
- **Example Project Cost Analysis Documentation (2).docx**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4715/

P111-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The standard is not written in enforceable language. (11-3)

P111-24

Individual Consideration Agenda

Comment 1:

IPC: 717.6

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

717.6 Relining materials. The relining materials shall be manufactured in compliance with applicable standards and certified as

required in Section 303. Cured-in-place-pipe (CIPP) ~~reline~~ materials shall be in accordance ~~comply~~ with ASTM F1216, ASTM F1743, ASTM F2561, ASTM F2599 or ASTM F3541. Hydrophilic rings or gaskets in CIPP rehabililtation shall be in accordance with ASTM F3240.Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Reason: This proposal was denied by CAH1 citing the standard is not written in enforceable language. The revised versions of ASTM F1216 and ASTM F1743 are anticipated to be approved by the date of the CAH#2. The addition of cured-in-place pipe materials to this section are made to define these materials within Section 717 given the approval during CAH#1 to move Section 718 to 717.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal simply move existing code from Section 718 to Section 717 and add industry standards. The requirements are not changed by this modification.

Comment (CAH2)# 755

P113-24

IPC: 717.6, 717.7 (New), 717.8 (New), ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials. The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303.~~Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

Add new text as follows:

717.7 Fold in form. Sectional repair using fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

717.8 Cured-in-Place-Pipe. Sectional repair using push or pull in place cure-in-place pipe (CIPP) shall be in compliance with ASTM F3541 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Sectional repair using inversion cure-in-place pipe (CIPP)shall be in compliance with ASTMF1216 or ASTM F2599 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Main and lateral cured-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F3541-22	Standard Practice for Sectional Repair of Existing Gravity Fow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-in-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Reason: ASTM F3541 is the preferred method of rehabilitation using CIPP technology inside the building parameter and ASTM F1216 is referenced for requirements in all other CIPP standards in Section 718. adding more clarification regarding Hydrophilic gaskets and rings is consistent with the requirements in Section 718 currently and is an health and safety issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

there is no material cost added to this code as the standards referenced are currently referenced in the code and the standards reference each other in most cases such as ASTM F1216 and ASTM F3541. ASTM F3240, and the required use of hydrophilic gaskets, is in Section 718 where the minimal cost is already recognized by the code.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube1,2* and ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The words about 'fold and form' method need to be eliminated. (11-3)

P113-24

Individual Consideration Agenda

Comment 1:

IPC: 717.8

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

717.8 Cured-in-Place-Pipe. Sectional repair using push or pull in place cure-in-place pipe (CIPP) shall be in compliance with ASTM F3541 using gaskets in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~. Sectional repair using inversion cure-in-place pipe (CIPP)shall be in compliance with ASTMF1216 or ASTM F2599 using gaskets in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~. Main and lateral cured-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561 using gaskets in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Reason: We would like to see the Committee accept this item with modifications. Those modifications would be to delete the wording "to ensure water tightness and elimination of ground eater penetration" after each mention of F3240. This action would be consistent with the Committee action on P 114.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The reason is the same as for the original submittal.

Comment (CAH2)# 580

P115-24

IPC: 717.10 (New), 717.10

Proposed Change as Submitted

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

717.10 Pressure Testing. The rehabilitated piping system shall be tested in accordance with Section 312.

Revise as follows:

~~**717.10**~~ **717.11 Approval.** Upon verification of compliance with the requirements of Sections 717.1 through ~~717.9~~ 717.10, the code official shall approve the installation.

Reason: All sanitary drainage systems must be pressure tested in accordance with Section 312 as is noted in Section 701.6 and 716.8 in Chapter 7. It also needs to be clarified in Section 717 and 718 that this is necessary.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Pressure testing is required in multiple Sections of the code currently and the cost allowance is already recognized.

P115-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The code needs to be clarified that pressure testing needs to be performed on relined piping. The presence of Section 312 is not sufficient. (11-3)

P115-24

Individual Consideration Agenda

Comment 1:

IPC: 717.10

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Plumbing Code

Revise as follows:

717.10 Tests ~~Pressure Testing~~. ~~Upon verification of compliance with the requirements of Sections 717.1 through 717.9, the code official shall approve the installation.~~The rehabilitated piping system shall be tested in accordance with Section 312.

Reason: Editorial for consistency with the code. "312 Tests and Inspections." " 701.6 Tests." "pressure testing" is not used.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal are editorial. The requirements are not changed by this modification.

Comment (CAH2)# 758

P116-24

IPC: SECTION 202 (New), 718.1, ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Joanne Carroll, Subtegic Group Inc., Subtegic Group Inc (jcarroll@subtegic.com)

2024 International Plumbing Code

Add new definition as follows:

CURED-IN-PLACE PIPE (CIPP). A system consisting of a flexible textile tube saturated with a thermosetting resin used to rehabilitate existing pipe in-place by insertion and cure within an existing pipe.

Revise as follows:

718.1 Cured-in-place pipe (CIPP). The cured-in-place pipe (CIPP) materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Sectional cure-in-place~~ CIPP rehabilitation of building drain and *building sewer* piping ~~and *sewer* service lateral piping~~ shall be installed in accordance with ASTM F1216, ASTM F3541, or F2599. ~~Main and lateral cure-in-place~~ CIPP rehabilitation of a *building sewer* ~~and *sewer* service lateral pipe~~ and ~~their~~ its connection~~s~~ to the main *sewer* pipe shall be installed in accordance with ASTM F2561. Seamless molded ~~H~~ hydrophilic ~~rings or~~ gaskets in ~~cure-in-place~~ CIPP rehabilitation of ~~*building sewer* piping and *sewer* service~~ lateral~~s~~ pipelines shall be installed in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 2022	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F3541 - 2022	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Reason: As is the case with all plumbing-related pipe, materials, fittings and fixtures, in order to ensure quality and appropriateness for the intended use, CIPP lining materials must be manufactured in accordance with an industry standard.

The addition of CIPP installation standards ASTM F1216 and ASTM F3541 cover the requirements for the installation of CIPP when using the inversion or pushed or pulled-in place installation methods.

Reference to ASTM F2561 is made to clearly describe the scope of F2561 as appropriate for the reference to installation of CIPP for the rehabilitation of a building sewer and its connection to the main. Reference to ASTM F3240 is clarified to the scope of ASTM F3240 that is specific to covering the requirements for the installation of seamless molded hydrophilic gaskets in the CIPP rehabilitation of main and lateral pipelines.

Bibliography: Scope from ASTM F2561 - "*1.1 This practice covers requirements and test methods for the reconstruction of a sewer service lateral pipe having an inner diameter of 3 to 12 in. (7.6 to 30.5 cm) and its connection to the main pipe having an inner diameter of 6 to 24 in. (15.2 to 61.0 cm) and up the lateral a maximum of 150 ft (46 m) without excavation."*

Scope from ASTM F3240 - *"1.1 This practice covers the requirements for the installation of seamless molded hydrophilic gaskets (SMHG) in cured-inplace pipe (CIPP) rehabilitation of main and lateral pipelines."*

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal adds industry standards and provides clarity for the application of CIPP already included in the code.

P116-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: ASTM F1216 has unenforceable language. (12-2)

P116-24

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202, 718.1

Proponents: Joanne Carroll, Subtegic Group Inc, Subtegic Group Inc (jcarroll@subtegic.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Delete without substitution:

~~**CURED-IN-PLACE PIPE (CIPP).** A system consisting of a flexible textile tube saturated with a thermosetting resin used to rehabilitate existing pipe in place by insertion and cure within an existing pipe.~~

Revise as follows:

718.1 Cured-in-place pipe (CIPP). The cured-in-place pipe (CIPP) materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. CIPP rehabilitation of building drainage system piping and *building* ~~*sewer*~~ *sewers* ~~piping~~ shall be installed in accordance with ASTM F1216, ASTM F3541, or ASTM F2599. CIPP rehabilitation of a *building sewer* and its connection to the main *sewer* pipe shall be installed in accordance with ASTM F2561. ~~Seamless molded hydrophilic~~ Hydrophilic rings or gaskets in CIPP rehabilitation of building sewer piping ~~lateral pipelines~~ shall be installed in accordance with ASTM F3240.

Reason: This proposal was denied by CAH1 citing the standard is not written in enforceable language. Since this is a new standard proposed for inclusion in the code and submitted in the proposal in at least a consensus draft form in accordance with Section 4.4 of CP28, changes have been made to the listed Sections in ASTM F1216 following the ANSI development process and anticipated to be completed and readily available prior to the Public Comment Hearing in accordance with Section 4.6.3.1.1.

ASTM F1216 is the oldest and foremost industry referenced standard for cured-in-place pipe. Compliance to ASTM F1216 is required in all of the existing referenced standards in the 2024 IPC - ASTM F2599, ASTM F2561 and ASTM F3240. Because cured-in-place pipe materials are produced by a variety of individual manufacturers, the addition of ASTM F1216 provides critical product material and installation instructions necessary for the installed product to work properly that is not included within the existing referenced standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal provide alternatives for the installation of CIPP in accordance with recognized industry standards.

Comment (CAH2)# 765

P117-24 Part I

IPC: 718.1, ASTM Chapter 15 (New)

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

718.1 Cure-in-place. ~~Sectional c~~Cure-in-place rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. ~~Main and lateral cure-in-place rehabilitation of *building sewer* and *sewer* service lateral pipe and their connections to the main *sewer* pipe shall be in accordance with ASTM F2561.~~ Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and *sewer* service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added this new Section 718, but left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

P117-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Some of the proposed standards are written in unenforceable language. (13-1)

P117-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: 718.1

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

718.1 Cured-in-place pipe (CIPP). Cured-in-place pipe (CIPP) rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. Hydrophilic rings or gaskets in ~~cure-in-place~~ CIPP rehabilitation of *building sewer* piping and *sewer* service laterals shall be installed in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Reason: This proposal was denied by CAH1 due to one of the ASTM standards having unenforceable language, with a request to bring the proposal back at the next committee action hearing. The revised version of this standard, ASTM F1216, is anticipated to be approved by the date of the second committee action hearing.

Additionally, editorial changes were made to utilize standard industry terminology: "Cured-in-Place Pipe (CIPP)," and to remove unnecessary language which is better suited to be commentary.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal simply edit the terminology slightly to better conform to industry standards. The requirements are not changed by this modification.

Comment (CAH2)# 446

P117-24 Part II

IRC: P3012.1 (New), ASTM Chapter 44 (New)

Proposed Change as Submitted

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov)

2024 International Residential Code

Add new text as follows:

P3012.1 Cure-in-place. Cure-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line
F3240-19 (2023)	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added a new Section 718 to the IPC, but nothing was added for the Residential Provisions and 718 left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal pulls in the language from the IPC and adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There didn't appear to a major section (P3012) in the code for this new section to be placed under. (10-0)

P117-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: SECTION 3012 (New), P3012.1, ASTM Chapter 44 (New)

Proponents: Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, NYS DOS, NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Add new text as follows:

SECTION 3012
REHABILITATION OF BUILDING SEWERS AND DRAINS

Revise as follows:

P3012.1 Cured-in-place pipe (CIPP). Cured-in-place pipe (CIPP) rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. Hydrophilic rings or gaskets in ~~cure-in-place~~ CIPP rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Add new text as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F2561-20 Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line

Reason: The proposal was initially submitted without the creation of section 3012 which subsection 3012.1 would fall under. This modification adds the section to address the committee comments.

Additionally, editorial changes were made to utilize standard industry terminology: "Cured-in-Place Pipe (CIPP)," and to conform to changes made to part 1 of this proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The modifications to this proposal simply edit the terminology slightly to better conform to industry standards. The requirements are not changed by this modification.

Comment (CAH2)# 454

P120-24

IPC: SECTION 202 (New), 802.1.9 (New)

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Add new definition as follows:

DUMP SINK. A sink provided in food service operations for the sole purpose of dumping leftover liquids from drinking containers, these sinks can be stand-alone fixtures or in combination with a 3-compartment sink.

Add new text as follows:

802.1.9 Dump sinks. When dump sinks are required, they shall discharge directly or indirectly through an air gap or air break to the drainage system.

Reason: Public health agencies are requiring these fixtures in an effort to keep food service operation staff from dumping leftover liquids/beverages into food preparation sinks where they could cause a potential contamination issue. This proposal is intended to provide direction for how these fixtures should be viewed and how they will be permitted to discharge to the drainage systems.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These sinks are already being required by public health agencies so there would be no additional costs.

P120-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The dump sink definition needs to be two sentences. (10-3)

P120-24

Individual Consideration Agenda

Comment 1:

IPC: SECTION 202

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

DUMP SINK. A sink provided in food service operations for the sole purpose of dumping leftover liquids~~.~~. These ~~these~~ sinks can be stand-alone fixtures or in combination with a 3-compartment sink.

Reason: Public health agencies are requiring these fixtures in an effort to keep food service operation staff from dumping leftover liquids/beverages into food preparation sinks where they could cause a potential contamination issue. This proposal is intended to provide direction for how these fixtures should be viewed and how they will be permitted to discharge to the drainage systems.

Changes have been made as suggested by the IPC Code Development Committee during CAH #1.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These sinks are already being required by public health agencies so there would be no additional costs.

Comment (CAH2)# 408

P121-24

IPC: 802.4, 802.4.3

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

802.4 Waste receptors. For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors. *Ready access* shall be provided to waste receptors. **Exception:** *Access* shall be provided for automatic clothes washer standpipe drains for rodding.

802.4.3 Standpipes. Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches (457 mm) but not greater than 42 inches (1067 mm) above the trap weir. ~~*Access* shall be provided to standpipes and drains for rodding.~~

Reason: It is imperative that indirect waste receptors are provided with 'Ready Access" since they receive indirect waste discharge. Without the clear view of the waste receptor, a backup in the drainage system can result in damage due to the concealed location of the waste receptor. The portion of this section which previously indicated standpipes shall be provided with "Access" allows for all standpipes to be concealed in some fashion. Allowing for "Access" to be provided specifically for automatic clothes washer standpipe makes sense due to the fact there is a minimum and maximum height the standpipe is permitted to extend above the trap which results in many of these being concealed by the automatic clothes washers. However, if only providing "Access" is permitted for all types of standpipes, it results in standpipes located under counters behind cabinet doors where they will not be observable to the occupants.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not positively or negatively impact costs, it just clarifies which waste receptors are required to be provided with "Ready Access" and which ones are required to be provided with "Access".

P121-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The original sentence places the access requirements where they belong. (9-4)

P121-24

Individual Consideration Agenda

Comment 1:

IPC: 802.4, 802.4.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Submitted

Reason: Section 802.4 covers all waste receptors that receive indirect waste discharge, and as the definition of a waste receptor indicates, this includes all standpipes, including Automatic clothes washers. The section also includes areas where waste receptor should not be installed and a requirement for waste receptors to be provided with "Ready Access". Since the primary section speaks to the access for maintenance that must be provided, it is in this section where any exceptions to that level of access should be listed, and since it is a specific exception it should remain as an exception and not in the body of the section.

- **ACCESS (TO).** That which enables a fixture, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction (see "*Ready access*").
- **READY ACCESS.** That which enables a fixture, appliance or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction and without the use of a portable ladder, step stool or similar device.
- **WASTE RECEPTOR.** A floor sink, standpipe, hub drain or floor drain that receives the discharge of one or more indirect waste pipes.

It is imperative that indirect waste receptors are provided with 'Ready Access" since they receive indirect waste discharge. Without the clear view of the waste receptor, a backup in the drainage system can result in damage due to the concealed location of the waste receptor. The portion of this section which previously indicated standpipes shall be provided with "Access" allows for all standpipes to be concealed in some fashion. Allowing for "Access" to be provided specifically for automatic clothes washer standpipe makes sense due to the fact there is a minimum and maximum height the standpipe is permitted to extend above the trap which results in many of these being concealed by the automatic clothes washers. However, if only providing "Access" is permitted for all types of standpipes, it results in standpipes located under counters behind cabinet doors where they will not be observable to the occupants.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 410

P125-24 Part I

IPC: 905.2

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

905.2 Grade. Horizontal ~~Vent~~ vent and *branch vent* pipes shall be installed level, or sloped ~~so graded and connected as~~ to drain back to the drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

P125-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Vent piping should be sloped to promote drainage back to the drainage system. (13-0)

P125-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: 905.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

905.2 Grade. Horizontal vent and branch vent pipes shall be installed level or be sloped, and supported to allow moisture and condensate to drain back to the drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system. Although the residential committee also disapproved this during CAH #1, they just asked that the additional language I have included in this proposal be kept from the original code language. This practice is used internationally as well as in the UPC and simply provides an option for installers.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

Comment (CAH2)# 511

P125-24 Part II

IRC: P3104.2

Proposed Change as Submitted

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3104.2 Grade. Horizontal ~~Vent~~ vent and branch vent pipes shall installed level, or be ~~graded~~ sloped~~, connected and supported to allow moisture and condensate~~ to drain back to the ~~soil or waste~~ drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

P125-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The phrase "connected and supported" needs to remain in the code. (10-0)

P125-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: P3104.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Residential Code

Revise as follows:

P3104.2 Grade. Horizontal vent and branch vent pipes shall be installed level or be sloped, and supported to allow moisture and condensate to drain back to the drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system.

I have added back in the language the committee suggested should be kept from the original text.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

Comment (CAH2)# 510

P127-24

IPC: 907.1, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.1 Vent for horizontal offset of drainage stack. Horizontal offsets of drainage *stacks* shall be vented where five or more *branch intervals* are located above the offset. The offset shall be vented by venting the upper section of the drainage *stack* and the lower section of the drainage *stack*, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016 Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Reason: The current language does not address single stack drainage systems where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals from positive pressure transients in the drainage system.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **PPRD Manual.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4540/
- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4539/
- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4236/

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P127-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This device has not been tested for pressures that could occur during a sewer surcharge event. Language would be better placed in Section 917. (12-1)

P127-24

Individual Consideration Agenda

Comment 1:

Proponents: steven white, Aliaxis, Aliaxis (swhite@aliaxis.com) requests As Submitted

Reason: 1: Device Testing for Sewer Surcharge Events Transient The objection that the device has not been tested for pressures that could occur during a sewer surcharge event is unfounded. The device has been specifically designed and tested to handle sewer surcharge transient events at the base of stacks and offsets. These transient surcharge pressures should not exceed +400 Pa (1.6 inch WG), as this is the threshold where positive or negative transients begin to affect the appliance water trap seals.

The device has been developed to attenuate positive transients. According to ASSE 1030, Chapter 3.5 “Device Characteristic Performance Test,” Chapter 3.6 “Device Opening Time Test,” and Chapter 3.7 “Device Filling Time Test,” the performance of the device in attenuating positive transients has been thoroughly addressed.

2: Pressure from Sewer Surcharge Events

The second objection may concerns the pressure from a sewer surcharge event, which occurs when the drainage pipe becomes surcharged at the base of the stack or offsets due to: a) Hydraulic flow exceeding the hydraulic performance of the pipe size. b) A restriction caused by a partial or full blockage.

In such cases, the positive pressure will not be transient but will rise more slowly, leading to a hydrostatic event. This scenario is partially addressed within the IPC Drainage and Vent Water Test:

Drainage and Vent Water Test: A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but sections shall not be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, not less than the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.

In this test, the pressure would be 4.27 psi (29.4 kPa)
According to ASSE 1030, Chapter 3.1 “Air Tightness Test,” the units are tested to 5 psi (34.5 kPa). This indicates that the device has been tested to withstand a hydrostatic (surcharge) event equivalent to a 10-foot (3 m) surcharge before the device. Therefore, the objection that the device has not been tested is incorrect, as the device tested to ASSE 1030 has been evaluated for both positive transients and surcharge pressures.

As P127- 24 is for offsets the image attached shows the surcharge event in the offset, and how a vent bypass or the device (PTA pressure transient attenuator) with AAV can vent the offset, which is the purpose of the P127-24 to allow the device with AAV as an alternative venting solution with better or same performance as a bypass vent.

Also see attached file for the PAPA best practice guide where guidance is offered on the offsets as well as the whole system.

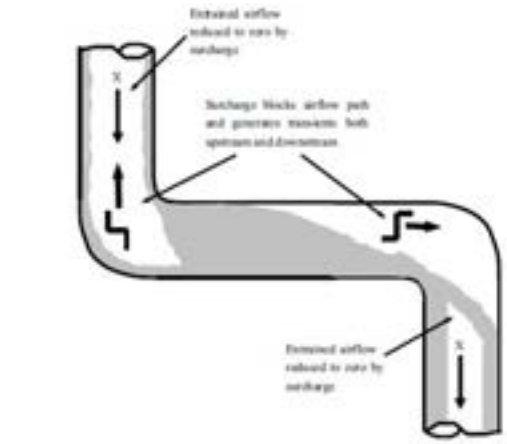


Figure 4.35 Offset surcharge in a vertical stack

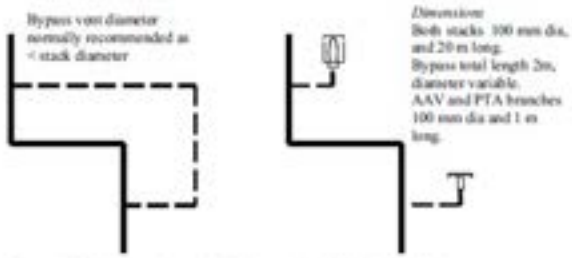


Figure 4.36 Offset venting or installation of an AAV / PTA combination

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **PAPA Best Practice Guide Updated 2017.pdf**
  https://www.cdpaccess.com/comment/499/32278/files/download/7910/

Comment (CAH2)# 499

Comment 2:

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com) requests As Submitted

Reason: The objection that this device has not been tested for pressures that could occur during a sewer surcharge event, is not correct: Devices conforming to ASSE 1030 are tested to 5 psi (36Kpa).However, in a sewer surcharge event, positive pressures in the system will vent out through the open vent that is required in the manufacturer's installation instructions. The attached paper also explains the air pressure associated with the surcharge from the sewer into the building, as you can see the Positive Air Pressure Attenuator (PAPA) and Air Admittance Valve (AAV) are cited as a solution to protect the building from these events. Note that the pressure rating in ASSE 1030 is based on 312.2 of the IPC requirements:312.2 Drainage and vent water test. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but sections shall not be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, not less than the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Vents for Offsets.pdf**
  https://www.cdpaccess.com/comment/776/32881/files/download/8046/
- **HWU Surcharge - IPC.pdf**
  https://www.cdpaccess.com/comment/776/32881/files/download/8032/

Comment (CAH2)# 776

P128-24

IPC: 907.2, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.2 Upper section. The upper section of the drainage *stack* shall be vented as a separate *stack* with a vent *stack* connection installed in accordance with Section 904.4, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed above the offset in the stack in accordance with the manufacturer's instructions. The offset shall be considered to be the base of the *stack*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016 Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices (PPRDs) conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients. PPRDs are used to reduce positive pressures at the base of the stack.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

Estimated Life Cycle Cost Impact:

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P128-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The added language would be better as an exception in Section 917. (11-2)

P128-24

Individual Consideration Agenda

Comment 1:

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com) requests As Submitted

Reason: See attached file regarding offsets.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Vents for Offsets.pdf**
  https://www.cdpaccess.com/comment/780/32888/files/download/8050/

Comment (CAH2)# 780

Comment 2:

Proponents: steven white, Aliaxis, Aliaxis (swhite@aliaxis.com) requests As Submitted

Reason: The active drainage single stack system has an equal to better performance, as a secondary vent system, this system has been fully researched and tested, and installed in high-rise buildings around the world since 2003, it is part of the Australian plumbing code the AS3500-2 standard since the early 2000's. The system has been fully researched and reviewed, and I recommend reading the "Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK" to understand the fluid mechanics of DWV systems for taller buildings. The following could be used for understanding to support the current wording changes or an addition to the section 917 (single stack)

Causes and behaviour of air pressure transients in building drainage systems: Air pressure transients generated within the building drainage system obey the same mechanisms that govern transient generation and propagation in any fluid carrying system. In general terms, pressure transients are generated as a consequence of changes to the flow conditions at some point within the system and are the means by which such changes are
communicated throughout the system (Swaffield, 2010). The Joukowsky expression provides the fundamental relationship between pressure rise, wave speed, fluid density and flow velocity:

$\Delta p = -pc\Delta V$

where Δp is pressure change, p is the fluid density, c is the wave speed and ΔV is flow velocity change. The significance of the negative sign means that pressure increases with a decrease of velocity, and vice versa.

Within the building drainage system, air pressure transients are generated due to changes in the entrained airflow as a consequence of changes to the annular water downflow initiated by the random discharge of system appliances. Increasing annular downflow generates an enhanced entrained airflow which reduces the system pressure. Slowing-down or stopping the airflow, due to some blockage of the passage of air caused by the formation of a water curtain by either wastewater flowing from a branch into the stack or by the change of

flow direction at an offset or the stack base, generates positive air transients (Swaffield et al., 2004). Pressure fluctuations from external events, such as surcharging of the main sewer, can also generate transients within the system. These low-amplitude air pressure transients, whose magnitude are dependent upon the rate of change of system conditions, are transmitted and or reflected at all boundaries within the system including open terminations, connections to the sewer, appliance trap seals, and pipe junctions. An openended pipe, such an open stack termination, has a reflection coefficient of -1, while a closedended pipe, such as an appliance trap seal, has a reflection coefficient of +1. Changes in the system characteristics, such as a change in diameter or the inclusion of a pipe junction, will alter the transmitted wave and induce a reflection.

What portion of the transient is reflected and transmitted, is dictated by both the pipe material (which affects wave speed) and pipe diameter. The time taken for a transient to travel to a reflecting boundary and return to its source is known as the pipe period and is given by the expression: pipe period=2L/c

where L is the pipe length and c is the wave speed. For most stack to branch situations this relates the division of a pressure transient to the ratio of pipe cross sectional areas, however when a positive pressure reduction devices (PPRDs) is included in the design the division is much greater since the positive pressure reduction devices (PPRDs) also operates on the wave speed (c in equation 2-4 above). This is means that in a fully vented system using traditional pipe junctions a parallel vent pipe of at least 200 mm and a length of 100 m would be required to achieve the same reduction in positive air pressure transient. Consequences of air pressure transients in building drainage systems:

While the air pressure transients generated within the building drainage system are of low amplitude, they are, however, responsible for compromising system integrity and enabling cross-contamination of habitable space through the destruction of water trap seals. Negative air pressure transients are capable of depleting the water trap seal by either induced or self-siphonage by creating a suction pressure within the pipe adjacent to the trap. Positive air pressure transients are capable of displacing the water trap seal upwards towards the appliance which will either force air through the water seal into the appliance, or if of sufficient magnitude, cause the water seal to be completely displaced into the appliance, leaving the trap wither wholly or partially depleted. A depleted trap seal permits airflow both into and out of the drainage system, thus allowing foul air to exit the system and enter habitable space.

Control and suppression of air pressure transients Air pressure transients are an unwanted consequence of normal system operation and, although unavoidable, it is possible to protect water trap seal integrity through the correct alleviation of any pressure fluctuations. Traditionally, this has been approached through passive solutions which rely on the provision of cross connections and vertical stacks vented to atmosphere. However, this approach, while both proven and traditional, has inherent limitations (Swaffield, 2006). The key to maintaining a balance of pressure within the building drainage system is to provide pressure relief as close to the source as possible; long pipe runs and remote vent terminations lead to delays in the arrival of relieving reflections and therefore compromise system integrity. More recently, active solutions to the control and suppression of air pressure transients have been developed providing necessary localised relief.

Negative air pressure transients, which communicate the need for more air and represents a suction force, can be alleviated by air admittance valves (AAVs) which, responding directly to the local pressure conditions, opens as the pressure falls to allow inward relief airflow, hence limiting the pressure excursions experienced by the water trap seal. To avoid compromising system integrity by allowing foul sewer gases to enter the building, the AAV is designed with a fail-safe mechanism which ensures that it remains closed when not in use or when the local pressure exceeds atmospheric. AAVs can be installed locally to the water trap seal or at the stack termination to avoid the need for a roof penetration

Positive air pressure transients, which communicate the need to reduce the airflow and represents a pushing force, can be alleviated by variable volume containment attenuators (positive pressure reduction devices (PPRDs)) which absorb the airflow driven by positive air pressure transients. The positive pressure reduction devices (PPRDs), consisting of a variable volume bag that expands under the influence of a positive pressure transient, is capable of reducing the magnitude of a positive air pressure transient by up to 90% (Swaffield et al., 2005a, 2005b) by providing an alternative route which diverts and attenuates the system airflows gradually due to the significantly reduced wave speed within the positive pressure reduction devices (PPRDs). due to the properties of its elastic pipe construction. Designed as a collapsible reservoir, the variable volume bag provides an additional volume unseen by the system when the pressure regime at that point is sub-atmospheric, which absorbs the extra air induced by the positive air pressure transient.

Each positive pressure reduction devices (PPRDs) must meet the testing requirements of ASSE 1030

Base of stack.

The base of the stack is the most likely place for a blockage in the airflow to occur. As the distance between the base of the stack and the top stack termination is the maximum distance possible within the system, then a blockage at this location will lead to the greatest possible pressure rise. It is therefore recommended to use two PPRDs in series at the base of the stack. The devices should be located below the first branch connected to the stack. Note that is it still recommend that branches in the lower part of the stack be connected directly to the horizontal drainage and not to the main stack.
Offsets within the vertical stack, which in the past were wrongfully thought to “slow down” the water flow in tall buildings, can also be the cause of significant positive pressure
transients as they forcibly change the flow direction. It is recommended to use PPRDs above the offset.

Top of stack
It is optional to have a PPRDs located immediately below the top of the stack above the highest branch in the building. It should be noted that this point does not need to be at the top of the building, but merely above the last branch. The system can be terminated with an AAV to provide ventilation, and a PPRDs to assist in attenuating any positive transients in the system.

Distributed locations
As the operation of system appliances, which discharge wastewater into the system and hence govern the conditions necessary for air entrainment and pressure transient propagation, are entirely random, it is virtually impossible to predict where the greatest area of risk in the system will be. Given also, that the volume of extra air within the system, as a result of the propagating positive pressure transients, is dependent upon airflow rate, blockage closure time, and the system pipe period; all of which will change, then to accommodate these uncertainties, PPRDs should be distributed strategically throughout the height of the stack

Number of Devices
The number of devices installed in a system depends on the height of the building and the risk of air pressure transients being generated. This can be determined, in the main, using the building, and in particularly the intensity of usage.

For example, a stadium design, Recommended installation of PPRDs due to the expected surges from sanitary appliances at peak usage times.

PPRDs Design Table for 4” and 6” (100mmDN/150mm DN) drainage stacks

3-10 floors	One unit on the base
11-15 floors	One unit on the base, one halfway
16-25 Floors	One unit on the base, one unit on floor 5, one Halfway between the remaining floors above floor 5
26+ floors	Two units in series on the base, then one unit on every 5th floor to the 25th floor, then one every 10th floor thereafter
Offsets	ne unit must be installed above offsets of less than 10 floors Two units must be installed above offsets more than of 20 floors

Bibliography: Swaffield, J.A. (2006). “Sealed building drainage and vent systems – an application of active air pressure transient control and suppression”, Building and Environment, 41, 1435-1446.

Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005a). "Pressure transient control: Part I - criteria for transient analysis and control." Building Services Engineering Research and Technology, 26(2), 99-114.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005b). "Pressure transient control: Part II - simulation and design of a positive surge protection device for building drainage networks." Building Services Engineering Research and Technology, 26(3), 195-212

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 578

P129-24

IPC: 907.3, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.3 Lower section. The lower section of the drainage *stack* shall be vented by a yoke vent connecting between the offset and the next lower horizontal *branch*. The yoke vent connection shall be permitted to be a vertical extension of the drainage *stack*. The size of the yoke vent and connection shall be not less than the size required for the vent *stack* of the drainage *stack*, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions and stack type air admittance valves shall be installed at the top of offset drainage stacks in accordance with ASSE 1050.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016 Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P129-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The added language would be better as an exception. (13-0)

Individual Consideration Agenda

Comment 1:

Proponents: steven white, Aliaxis, Aliaxis (swhite@aliaxis.com) requests As Submitted

Reason: The active drainage single stack system has an equal to better performance, as a secondary vent system, this system has been fully researched and tested, and installed in high-rise buildings around the world since 2003, it is part of the Australian plumbing code the AS3500-2 standard since the early 2000's. The system has been fully researched and reviewed, and I recommend reading the "Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK" to understand the fluid mechanics of DWV systems for taller buildings. The following could be used for understanding to support the current wording changes or an addition to the section 917 (single stack)

Causes and behaviour of air pressure transients in building drainage systems: Air pressure transients generated within the building drainage system obey the same mechanisms that govern transient generation and propagation in any fluid carrying system. In general terms, pressure transients are generated as a consequence of changes to the flow conditions at some point within the system and are the means by which such changes are communicated throughout the system (Swaffield, 2010). The Joukowsky expression provides the fundamental relationship between pressure rise, wave speed, fluid density and flow velocity:

$\Delta p=-pc\Delta V$

where Δp is pressure change, p is the fluid density, c is the wave speed and ΔV is flow velocity change. The significance of the negative sign means that pressure increases with a decrease of velocity, and vice versa. Within the building drainage system, air pressure transients are generated due to changes in the entrained airflow as a consequence of changes to the annular water downflow initiated by the random discharge of system appliances. Increasing annular downflow generates an enhanced entrained airflow which reduces the system pressure. Slowing-down or stopping the airflow, due to some blockage of the passage of air caused by the formation of a water curtain by either wastewater flowing from a branch into the stack or by the change of flow direction at an offset or the stack base, generates positive air transients (Swaffield et al., 2004). Pressure fluctuations from external events, such as surcharging of the main sewer, can also generate transients within the system. These low-amplitude air pressure transients, whose magnitude are dependent upon the rate of change of system conditions, are transmitted and or reflected at all boundaries within the system including open terminations, connections to the sewer, appliance trap seals, and pipe junctions. An openended pipe, such an open stack termination, has a reflection coefficient of -1, while a closedended pipe, such as an appliance trap seal, has a reflection coefficient of +1. Changes in the system characteristics, such as a change in diameter or the inclusion of a pipe junction, will alter the transmitted wave and induce a reflection.

What portion of the transient is reflected and transmitted, is dictated by both the pipe material (which affects wave speed) and pipe diameter. The time taken for a transient to travel to a reflecting boundary and return to its source is known as the pipe period and is given by the expression:

$\text{pipe period}=2L/c$

where L is the pipe length and c is the wave speed.

For most stack to branch situations this relates the division of a pressure transient to the ratio of pipe cross sectional areas, however when a positive pressure reduction devices (PPRDs) is included in the design the division is much greater since the positive pressure reduction devices (PPRDs) also operates on the wave speed (c in equation 2-4 above). This is means that in a fully vented system using traditional pipe junctions a parallel vent pipe of at least 200 mm and a length of 100 m would be required to achieve the same reduction in positive air pressure transient.

Consequences of air pressure transients in building drainage systems: While the air pressure transients generated within the building drainage system are of low amplitude, they are, however, responsible for compromising system integrity and enabling cross-contamination of habitable space through the destruction of water trap seals. Negative air pressure transients are capable of depleting

the water trap seal by either induced or self-siphonage by creating a suction pressure within the pipe adjacent to the trap. Positive air pressure transients are capable of displacing the water trap seal upwards towards the appliance which will either force air through the water seal into the appliance, or if of sufficient magnitude, cause the water seal to be completely displaced into the appliance, leaving the trap wither wholly or partially depleted. A depleted trap seal permits airflow both into and out of the drainage system, thus allowing foul air to exit the system and enter habitable space.

Control and suppression of air pressure transients
Air pressure transients are an unwanted consequence of normal system operation and, although unavoidable, it is possible to protect water trap seal integrity through the correct alleviation of any pressure fluctuations. Traditionally, this has been approached through passive solutions which rely on the provision of cross connections and vertical stacks vented to atmosphere. However, this approach, while both proven and traditional, has inherent limitations (Swaffield, 2006). The key to maintaining a balance of pressure within the building drainage system is to provide pressure relief as close to the source as possible; long pipe runs and remote vent terminations lead to delays in the arrival of relieving reflections and therefore compromise system integrity. More recently, active solutions to the control and suppression of air pressure transients have been developed providing necessary localised relief.

Negative air pressure transients, which communicate the need for more air and represents a suction force, can be alleviated by air admittance valves (AAVs) which, responding directly to the local pressure conditions, opens as the pressure falls to allow inward relief airflow, hence limiting the pressure excursions experienced by the water trap seal. To avoid compromising system integrity by allowing foul sewer gases to enter the building, the AAV is designed with a fail-safe mechanism which ensures that it remains closed when not in use or when the local pressure exceeds atmospheric. AAVs can be installed locally to the water trap seal or at the stack termination to avoid the need for a roof penetration

Positive air pressure transients, which communicate the need to reduce the airflow and represents a pushing force, can be alleviated by variable volume containment attenuators (positive pressure reduction devices (PPRDs)) which absorb the airflow driven by positive air pressure transients. The positive pressure reduction devices (PPRDs), consisting of a variable volume bag that expands under the influence of a positive pressure transient, is capable of reducing the magnitude of a positive air pressure transient by up to 90% (Swaffield et al., 2005a, 2005b) by providing an alternative route which diverts and attenuates the system airflows gradually due to the significantly reduced wave speed within the positive pressure reduction devices (PPRDs). due to the properties of its elastic pipe construction. Designed as a collapsible reservoir, the variable volume bag provides an additional volume unseen by the system when the pressure regime at that point is sub-atmospheric, which absorbs the extra air induced by the positive air pressure transient.
Each positive pressure reduction devices (PPRDs) must meet the testing requirements of ASSE 1030

Base of stack
The base of the stack is the most likely place for a blockage in the airflow to occur. As the distance between the base of the stack and the top stack termination is the maximum distance possible within the system, then a blockage at this location will lead to the greatest possible pressure rise. It is therefore recommended to use two PPRDs in series at the base of the stack. The devices should be located below the first branch connected to the stack. Note that is it still recommend that branches in the lower part of the stack be connected directly to the horizontal drainage and not to the main stack.
Offsets within the vertical stack, which in the past were wrongfully thought to “slow down” the water flow in tall buildings, can also be the cause of significant positive pressure
transients as they forcibly change the flow direction. It is recommended to use PPRDs above the offset.

Top of stack
It is optional to have a PPRDs located immediately below the top of the stack above the highest branch in the building. It should be noted that this point does not need to be at the top of the building, but merely above the last branch. The system can be terminated with an AAV to provide ventilation, and a PPRDs to assist in attenuating any positive transients in the system.

Distributed locations
As the operation of system appliances, which discharge wastewater into the system and hence govern the conditions necessary for air entrainment and pressure transient propagation, are entirely random, it is virtually impossible to predict where the greatest area of risk in the system will be. Given also, that the volume of extra air within the system, as a result of the propagating positive pressure transients, is dependent upon airflow rate, blockage closure time, and the system pipe period; all of which will change, then to accommodate these uncertainties, PPRDs should be distributed strategically throughout the height of the stack

Number of Devices

The number of devices installed in a system depends on the height of the building and the risk of air pressure transients being generated. This can be determined, in the main, using the building, and in particularly the intensity of usage.

For example, a stadium design, Recommended installation of PPRDs due to the expected surges from sanitary appliances at peak usage times.

PPRDs Design Table for 4” and 6” (100mmDN/150mm DN) drainage stacks

3-10 floors	One unit on the base
11-15 floors	One unit on the base, one halfway
16-25 Floors	One unit on the base, one unit on floor 5, one Halfway between the remaining floors above floor 5
26+ floors	Two units in series on the base, then one unit on every 5th floor to the 25th floor, then one every 10th floor thereafter
Offsets	ne unit must be installed above offsets of less than 10 floors Two units must be installed above offsets more than of 20 floors

Bibliography: Swaffield, J.A. (2006). “Sealed building drainage and vent systems – an application of active air pressure transient control and suppression”, Building and Environment, 41, 1435-1446.

Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005a). "Pressure transient control: Part I - criteria for transient analysis and control." Building Services Engineering Research and Technology, 26(2), 99-114.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005b). "Pressure transient control: Part II - simulation and design of a positive surge protection device for building drainage networks." Building Services Engineering Research and Technology, 26(3), 195-212

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 577

P130-24

IPC: 908.1, ASSE Chapter 15 (New)

Proposed Change as Submitted

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

908.1 Where required. Soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.When a single stack drainage system is installed utilizing a combination of air admittance valves and positive pressure reduction devices (PPRDs), a PPRD shall be permitted to serve as a relief vent for the stack when the PPRDs are located no greater than six (6) branch intervals apart, and installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016 Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Reason: The current code language does not address relief vents for single stack drainage systems. Positive pressure reduction devices conforming to ASSE 1030 installed in accordance with the manufacturer's instructions provide relief from positive pressure transients in waste stacks.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

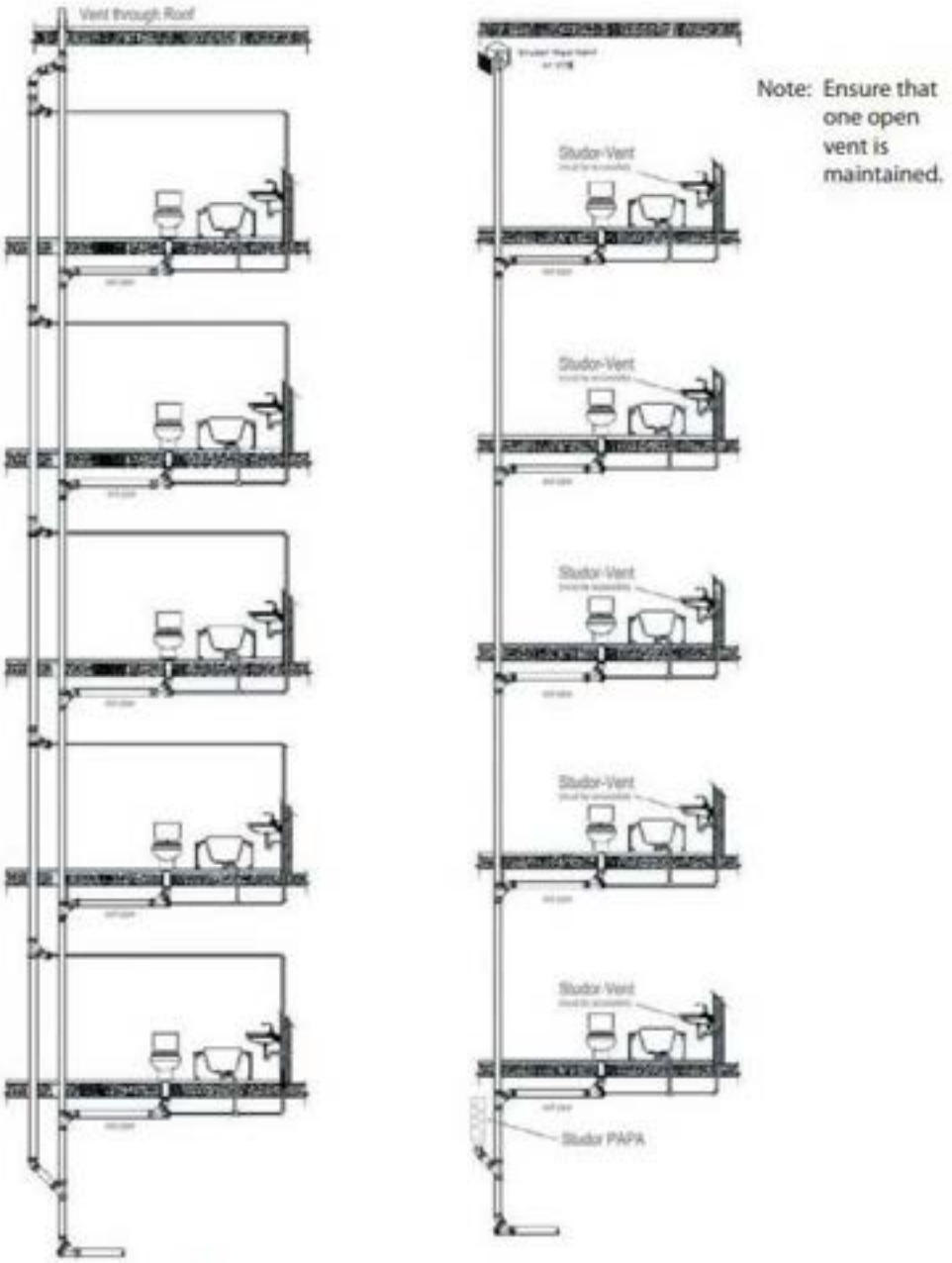
See Cost Impact Calculations

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Single Stack Costs	Units per Floor	Cost	Ext. Cost	Notes
Positive Pressure Reduction Device – one every 6 floors, per stack	0.167	$1,100.00	$ 183.70	
Stack-Type AAV – one per stack*	0.04	$ 95.00	$ 3.80	*calculation based upon 25 story example below
Branch-Type AAV – one per floor, per stack	1	$ 50.00	$ 50.00	
2" elbow coupling – one per floor, per stack	1	$ 20.00	$ 20.00	
2" hubless connectors – $8 (qty 2) = $16 per floor, per stack	2	$ 8.00	$ 16.00	
Labor – $95/hr x 10 hours (six floors, one stack)	0.167	$ 950.00	$ 158.65	
Total Cost per Floor, per stack for Single Stack System:			$ 432.15	
Conventional Two-Stack Costs:	**Units per Floor**	**Cost**	**Ext. Cost**	**Notes**
4" CI pipe (10 ft) – one per floor, per stack	1	$ 227.00	$ 227.00	
4" x 2" CI sanitary tee – one per floor, per stack	1	$ 39.00	$ 39.00	
4" hubless connector – two per floor, per stack	2	$ 18.00	$ 36.00	
2" hubless connector – five per floor, per stack	5	$ 8.00	$ 40.00	
2" CI pipe (10 ft) – three per floor, per stack	3	$ 103.00	$ 309.00	
2" Clevis hangers – four per floor, per stack	4	$ 24.00	$ 96.00	
2" All thread rod – four per floor, per stack	4	$ 3.00	$ 12.00	
2" Attachment device – four per floor, per stack	4	$ 14.00	$ 56.00	
4" Riser clamp – one per floor, per stack	1	$ 12.00	$ 12.00	
4" Fire stopping – one per hole/floor, per stack	1	$ 18.00	$ 18.00	
Labor – $95/hr x 72 hours (six floors, one stack)	0.167	$6,840.00	$1,142.28	
Labor – $28 to core each 6" ID hole in 4" slab - one per floor, per stack	1	$ 28.00	$ 28.00	
Total Cost per Floor for Conventional Two-Stack System:			$2,015.28	
Total Cost Savings per Floor, per Stack:			$1,583.13	

For example, in a 25-story condominium building with 24 waste stacks, the cost savings would be:
$1,583.13 cost x 25 stories = $39,578.25 per stack.
$39,578.25 cost per stack x 24 stacks in the building = $949,878.00 total savings.

STUDOR Risers with P.A.P.A. Devices and Studor Air Admittance Valves



Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P130-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The language doesn't require that the device needs to comply with the standard proposed. (13-0)

P130-24

Individual Consideration Agenda

Comment 1:

IPC: 908.1

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

908.1 Where required. Soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.When a single stack drainage system is installed utilizing a combination of air admittance valves and positive pressure reduction devices (PPRDs), a PPRD conforming to ASSE 1030 shall be permitted to serve as a relief vent for the stack when the PPRDs are located no greater than six (6) branch intervals apart, and installed in accordance with the manufacturer's instructions.

Reason: Initial proposal failed to reference the pertinent ASSE standard.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

See original proposal for cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original proposal for cost impact justification.

Comment (CAH2)# 783

Comment 2:

Proponents: steven white, Aliaxis, Aliaxis (swhite@aliaxis.com) requests As Submitted

Reason: The active drainage single stack system has an equal to better performance, as a secondary vent system, this system has been fully researched and tested, and installed in high-rise buildings around the world since 2003, it is part of the Australian plumbing code the AS3500-2 standard since the early 2000's. The system has been fully researched and reviewed, and I recommend reading the "Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK" to understand the fluid mechanics of DWV systems for taller buildings. The following could be used for understanding to support the current wording changes or an addition to the section 917 (single stack)

Causes and behaviour of air pressure transients in building drainage systems: Air pressure transients generated within the building drainage system obey the same mechanisms that govern transient generation and propagation in any fluid carrying system. In general terms, pressure transients are generated as a consequence of changes to the flow conditions at some point within the system and are the means by which such changes are
communicated throughout the system (Swaffield, 2010). The Joukowsky expression provides the fundamental relationship between pressure rise, wave speed, fluid density and flow velocity:

$\Delta p=-pc\Delta V$

where Δp is pressure change, p is the fluid density, c is the wave speed and ΔV is flow velocity change. The significance of the negative sign means that pressure increases with a decrease of velocity, and vice versa.

Within the building drainage system, air pressure transients are generated due to changes in the entrained airflow as a consequence of changes to the annular water downflow initiated by the random discharge of system appliances. Increasing annular downflow generates an enhanced entrained airflow which reduces the system pressure. Slowing-down or stopping the airflow, due to some blockage of the passage of air caused by the formation of a water curtain by either wastewater flowing from a branch into the stack or by the change of flow direction at an offset or the stack base, generates positive air transients (Swaffield et al., 2004). Pressure fluctuations from external events, such as surcharging of the main sewer, can also generate transients within the system. These low-amplitude air
pressure transients, whose magnitude are dependent upon the rate of change of system conditions,
are transmitted and or reflected at all boundaries within the system including open terminations, connections to the sewer, appliance trap seals, and pipe junctions. An openended pipe, such an open stack termination, has a reflection coefficient of -1, while a closedended pipe, such as an appliance trap seal, has a reflection coefficient of +1. Changes in the system characteristics, such as a change in diameter or the inclusion of a pipe junction, will
alter the transmitted wave and induce a reflection.

What portion of the transient is reflected and transmitted, is dictated by both the pipe material (which affects wave speed) and pipe diameter. The time taken for a transient to travel to a reflecting boundary and return to its source is known as the pipe period and is given by the expression: pipe period=2L/c

where L is the pipe length and c is the wave speed. For most stack to branch situations this relates the division of a pressure transient to the ratio of pipe cross sectional areas, however when a positive pressure reduction devices (PPRDs) is included in the design
the division is much greater since the positive pressure reduction devices (PPRDs) also operates on the wave speed (c in equation 2-4 above). This is means that in a fully vented system using traditional pipe junctions a parallel vent pipe of at least 200 mm and a length of 100 m would be required to achieve the same reduction in positive air pressure transient. Consequences of air pressure transients in building drainage systems:

While the air pressure transients generated within the building drainage system are of low amplitude, they are, however, responsible for compromising system integrity and enabling cross-contamination of habitable space through the destruction of water trap seals. Negative air pressure transients are capable of depleting the water trap seal by either induced or self-siphonage by creating a suction pressure within the pipe adjacent to the trap. Positive air pressure transients are capable of displacing the water trap seal upwards towards the appliance which will either force air through the water seal into the appliance, or if of sufficient magnitude, cause the water seal to be completely displaced into the appliance, leaving the trap wither wholly or partially depleted. A depleted trap seal permits airflow both into and out of the drainage system, thus allowing foul air to exit the system and enter habitable space.

Control and suppression of air pressure transients Air pressure transients are an unwanted consequence of normal system operation and, although unavoidable, it is possible to protect water trap seal integrity through the correct alleviation of any pressure fluctuations. Traditionally, this has been approached through passive solutions which rely on the provision of cross connections and vertical stacks vented to atmosphere. However, this approach, while both proven and traditional, has inherent limitations (Swaffield, 2006). The key to maintaining a balance of pressure within the building drainage system is to provide pressure relief as close to the source as possible; long pipe runs and remote vent terminations lead to delays in the arrival of relieving reflections and therefore compromise system integrity. More recently, active solutions to the control and suppression of air pressure transients have been developed providing necessary localised relief.

Negative air pressure transients, which communicate the need for more air and represents a suction force, can be alleviated by air admittance valves (AAVs) which, responding directly to the local pressure conditions, opens as the pressure falls to allow inward relief

airflow, hence limiting the pressure excursions experienced by the water trap seal. To avoid compromising system integrity by allowing foul sewer gases to enter the building, the AAV is designed with a fail-safe mechanism which ensures that it remains closed when not in use or when the local pressure exceeds atmospheric. AAVs can be installed locally to the water trap seal or at the stack termination to avoid the need for a roof penetration

Positive air pressure transients, which communicate the need to reduce the airflow and represents a pushing force, can be alleviated by variable volume containment attenuators (positive pressure reduction devices (PPRDs)) which absorb the airflow driven by positive air pressure transients. The positive pressure reduction devices (PPRDs), consisting of a variable volume bag that expands under the influence of a positive pressure transient, is capable of reducing the magnitude of a positive air pressure transient by up to 90% (Swaffield et al., 2005a, 2005b) by providing an alternative route which diverts and attenuates the system airflows gradually due to the significantly reduced wave speed within the positive pressure reduction devices (PPRDs). due to the properties of its elastic pipe construction. Designed as a collapsible reservoir, the variable volume bag provides an additional volume unseen by the system when the pressure regime at that point is sub-atmospheric, which absorbs the extra air induced by the positive air pressure transient.

Each positive pressure reduction devices (PPRDs) must meet the testing requirements of ASSE 1030

Base of stack.

The base of the stack is the most likely place for a blockage in the airflow to occur. As the distance between the base of the stack and the top stack termination is the maximum distance possible within the system, then a blockage at this location will lead to the greatest possible pressure rise. It is therefore recommended to use two PPRDs in series at the base of the stack. The devices should be located below the first branch connected to the stack. Note that is it still recommend that branches in the lower part of the stack be connected directly to the horizontal drainage and not to the main stack.
Offsets within the vertical stack, which in the past were wrongfully thought to “slow down” the water flow in tall buildings, can also be the cause of significant positive pressure
transients as they forcibly change the flow direction. It is recommended to use PPRDs above the offset.

Top of stack
It is optional to have a PPRDs located immediately below the top of the stack above the highest branch in the building. It should be noted that this point does not need to be at the top of the building, but merely above the last branch. The system can be terminated with an AAV to provide ventilation, and a PPRDs to assist in attenuating any positive transients in the system.

Distributed locations
As the operation of system appliances, which discharge wastewater into the system and hence govern the conditions necessary for air entrainment and pressure transient propagation, are entirely random, it is virtually impossible to predict where the greatest area of risk in the system will be. Given also, that the volume of extra air within the system, as a result of the propagating positive pressure transients, is dependent upon airflow rate, blockage closure time, and the system pipe period; all of which will change, then to accommodate these uncertainties, PPRDs should be distributed strategically throughout the height of the stack

Number of Devices
The number of devices installed in a system depends on the height of the building and the risk of air pressure transients being generated. This can be determined, in the main, using the building, and in particularly the intensity of usage.

For example, a stadium design, Recommended installation of PPRDs due to the expected surges from sanitary appliances at peak usage times.

PPRDs Design Table for 4” and 6” (100mmDN/150mm DN) drainage stacks

3-10 floors	One unit on the base
11-15 floors	One unit on the base, one halfway
16-25 Floors	One unit on the base, one unit on floor 5, one Halfway between the remaining floors above floor 5
26+ floors	Two units in series on the base, then one unit on every 5th floor to the 25th floor, then one every 10th floor thereafter
Offsets	ne unit must be installed above offsets of less than 10 floors Two units must be installed above offsets more than of 20 floors

Bibliography: Swaffield, J.A. (2006). “Sealed building drainage and vent systems – an application of active air pressure transient control and suppression”, Building and Environment, 41, 1435-1446.

Swaffield, J.A. (2010). Transient airflow in building drainage systems. Spon Press, Oxon, UK.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005a). "Pressure transient control: Part I - criteria for transient analysis and control." Building Services Engineering Research and Technology, 26(2), 99-114.

Swaffield, J.A, Campbell, D.P. and Gormley, M. (2005b). "Pressure transient control: Part II - simulation and design of a positive surge protection device for building drainage networks." Building Services Engineering Research and Technology, 26(3), 195-212

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 579

P150-24

IPC: 1102.4 (New)

Proposed Change as Submitted

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

1102.5 Relining Storm Drainage. The relining and rehabilitation of storm drainage systems using cured-in-place pipe (CIPP) shall be in accordance with ASTM F2599.

Reason: Storm drainage is certainly a candidate for rehabilitation by CIPP and it should be added to Chapter 11.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost allowance is already recognized by fact that the standard is already referenced in the code and technology is currently being used in drainage systems.

Staff Analysis: The proposed standard is in the current edition of the code.

P150-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: There are other means for rehabilitating storm sewers. The method is already in Chapter 7. (13-1)

P150-24

Individual Consideration Agenda

Comment 1:

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com) requests As Submitted

Reason: While there are other ways to rehabilitate storm drains ASTM F2599 is the appropriate standard for CIPP rehabilitation of storm drains and is already a recognized standard by the code in Chapter 7.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

P152-24

IPC: 1106.2, 1106.2.1, TABLE 1106.2, 1106.2.2 (New), 1106.2.3 (New), TABLE 1106.2.3 (New), TABLE 1106.2.3(1) (New), TABLE 1106.2.3(2) (New), TABLE 1106.2.3(3) (New), 1106.2.4 (New), TABLE 1106.2.4 (New)

Proposed Change as Submitted

Proponents: Christopher Winnie PE CPD, SmithGroup, self (chris.winnie@smithgroup.com)

2024 International Plumbing Code

Revise as follows:

1106.2 Size of storm drain piping. ~~Vertical and horizontal *storm drain* piping shall be sized based on the flow rate through the roof drain. The flow rate, as calculated in accordance with Section 1106.2.1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The flow rate in *storm drain* piping shall not exceed that specified in Table 1106.2.~~ The size of storm drain piping shall be in accordance with Sections 1106.2.1 through 1106.2.4.

1106.2.1 ~~Rainfall rate conversion method~~ Maximum storm water demand. ~~The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1.~~

$$GPM = R \times A \times 0.0104$$

~~where:R = Rainfall intensity in inches (mm) per hour.A = Roof area in square feet (m^2).~~ **~~(Equation 11-1)~~**

The volumetric flow rate of storm drainage shall be the sum of the connected roof drain(s). The total connected load shall be used as the basis for pipe sizing, assuming all roof drains are at full capacity simultaneously.

Delete without substitution:

~~TABLE 1106.2 STORM DRAIN PIPE SIZING~~

~~PIPE SIZE (inches)~~	~~VERTICAL DRAIN~~	~~CAPACITY (gpm) SLOPE OF HORIZONTAL DRAIN~~			
		~~$\frac{1}{16}$ inch per foot~~	~~$\frac{1}{8}$ inch per foot~~	~~$\frac{1}{4}$ inch per foot~~	~~$\frac{1}{2}$ inch per foot~~
~~2~~	~~34~~	~~15~~	~~22~~	~~31~~	~~44~~
~~3~~	~~87~~	~~39~~	~~55~~	~~79~~	~~111~~
~~4~~	~~180~~	~~81~~	~~115~~	~~163~~	~~231~~
~~5~~	~~311~~	~~117~~	~~165~~	~~234~~	~~331~~
~~6~~	~~538~~	~~243~~	~~344~~	~~487~~	~~689~~
~~8~~	~~1,117~~	~~505~~	~~714~~	~~1,010~~	~~1,429~~
~~10~~	~~2,050~~	~~927~~	~~1,311~~	~~1,855~~	~~2,623~~
~~12~~	~~3,272~~	~~1,480~~	~~2,093~~	~~2,960~~	~~4,187~~
~~15~~	~~5,543~~	~~2,508~~	~~3,546~~	~~5,016~~	~~7,093~~

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.~~

Add new text as follows:

1106.2.2 Sizing. Storm drain pipe sizing shall be sized in accordance with one of the following:

1. Pipe sizing tables or equations in accordance with Section 1106.2.3 and 1106.2.4
2. The sizing tables included in a listed piping system's manufacturer's installation instructions
3. Engineering methods.

1106.2.3 Sizing tables and equations. This section applies to horizontal drainage systems using building gravity. Where the drainage system material is known, Tables 1106.2.3(1), 1106.2.3(2) and 1106.2.3(3) shall be used to size drainage piping.
Where Equation 11-1 is used to determine the expected flow rate seen at a roof drain, or building drain.

Where Equations 11-2, 11-3 and 11-4 are used to size drainage piping based on the drainage pipe material used.

1. The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1, The Rational Method.$Q = C \times R \times A \times 0.0104$ (Equation 11-1)
   Where: C = Discharge Coefficient, *the roughness of the roof's surface.* Use 1.0 unless permitted by the local authority to factor in roof roughness for primary storm drainage. Secondary drainage shall use 1.0 in all cases.
   Q = Flow rate in gallons per minute (L/m)
   R= Rainfall intensity in inches (mm) per hour.
   A = Projected roof area in square feet (m^2)
2. The flow rates for horizontal sloped drains shall be calculated by use of the Flow Rate Equation and the Manning Equation based on full flow for pipe diameters of a given material, or coefficient of roughness.

   The Flow Rate Equation, Equation 11-2
   $Q = A \times V$ (Equation 11-2)

   Where: Q = Flow rate in gallons per minute (L/m)
   A = Cross-sectional area of the full flow

   V = Velocity of flow, feet per second (L/s)

   The Manning Equation, Equation 11-3
   $V = (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-3)
   Where: V = Velocity of flow, feet per second (m/s)

   k = unit conversion factor, 1.486 in English units

   n = roughness (Manning) coefficient

   R = hydraulic radius of pipe, ft (m); for full flow pipe, use radius of the pipe

   S = slope of pressure gradient

   The modified Flow Rate Equation, Equation 11-4
   $Q = A \times (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-4)

TABLE 1106.2.3 ROUGHNESS COEFFICIENT, n, FOR USE IN EQUATION 11-4

Surface Material	Manning's Roughness Coefficient, n
Cast iron, new	0.012
Cast iron, aged	0.0151
Concrete pipe	0.013
Copper	0.011

PVC	0.010
Vitrified Clay	0.014

TABLE 1106.2.3(1) PVC PIPE

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	12	17	25	35
3	37	50	74	105
4	80	110	160	225
5	145	205	290	410
6	235	330	470	665
8	505	715	1,015	1,435
10	920	1,300	1,845	2,605
12	1,500	2,120	3,000	4,240
15	2,720	3,845	5,440	7,690

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(2) CAST IRON PIPE, AGED

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	8	11	15	23
3	24	35	49	69
4	53	75	105	150
5	95	135	190	270
6	155	220	310	440
8	335	475	670	950
10	610	860	1,220	1,725
12	990	1,405	1,985	2,810
15	1,800	2,545	3,600	5,095

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(3) CAST IRON PIPE, NEW

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	10	14	21	29
3	30	40	60	85
4	65	90	130	185
5	120	170	240	340
6	195	275	390	555
8	420	600	845	1,200
10	765	1,085	1,535	2,170
12	1,250	1,765	2,500	3,535
15	2,265	3,205	4,530	6,410

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

1106.2.4 Vertical sizing table. Vertical storm drain piping shall be sized for the expected flow rate through the roof drain(s). The flow rate, as calculated in accordance with Section 1106.2.2, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The storm drain piping shall not exceed that specified in Table 1106.2.4.

TABLE 1106.2.4 Vertical sizing table

PIPE SIZE (inches)	CAPACITY (gpm)
2	34
3	87
4	180
5	310
6	535
8	1,115
10	2,050
12	3,270
15	5,540

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

Reason: If a building using cast iron storm drain pipe built from the model 2015, 2018, 2021 or 2024 codes were to have roof issues in the future; there is risk to the ICC because of faulty information in sizing storm drains. This proposal aims to fix that so engineers can follow a more complete model code.

As engineers, we have an ethical contract to not impose a hazard onto the occupants of the buildings we design. In its current form, the storm piping code imposes a hazard onto the occupants of the buildings we design. If we follow the current storm drain sizing criteria in 1106 and cast iron pipe is used, then the pipes would undersized between 20-50%, pending the size and slope of the installed pipe. Undersizing roof drain pipes increasing the possibility of the primary drains being overloaded and water ponding on the roof greater than the assumptions made by the structural engineer. The printed Tables in the 2015, 2018, 2021 and 2024 codes are assuming PVC pipe. The printed Tables in the IPC 2012 and earlier editions assumed aged cast iron. We must change this code immediately for the safety of the public and for the engineer's awareness in sizing pipes for a proper working system. This proposed change is a large overhaul from prior storm drainage sections, a code and commentary could be provided, but I didn't submit the context for that here. The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences, so that the ICC reads similarly.

Use of roughness coefficients for tall/thick green roofs is viable, which is why mention of the complete Rational Method is shared. It would be fantastic if plumbing engineers use the same formulas as our Civil friends. It is true, storm piping within a building would have gravitational influence to drain faster if there is ponding at the roof drain, but this level of complexity does not appear warranted.

The manipulation of units can be seen/tested in the excels attached. PDFs are also included. I trusted the Manning's Roughness Coefficients from engineering toolbox, and have included them as a reference. The aged cast iron value for "n" was reverse engineered from the legacy storm tables. See documents "Manning Formula_proving code is based on Manning.pdf" and "Storm Rationale Method_04-Storm Drainage Calc.pdf" to see how accurate use of Manning Equation is to the legacy storm tables, so 0.0152 was proposed for the 2027 code to give homage to all storm tables of the last 20 years. PDFs and excel justifying the proposed tables are attached to answer questions about how the numbers were generated, and the excel can be used to see how the proposed Equations can be used should a less common pipe material be used.

Bibliography: For pipe roughness coefficients:

https://www.engineeringtoolbox.com/mannings-roughness-d_799.html

The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences

The Rational Method and Manning Equation were sourced from my college fluid dynamics book. But they are readily available formulae that need not be sourced, right? I can provide more information as needed.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$20 / foot of storm pipe.

Estimated Immediate Cost Impact Justification (methodology and variables):

The potential cost increase would only be for cast iron (metal) pipe. The current code edition reflects pipe sizes for PVC/plastic pipe, and those values in the charts remain the same.

The cost was calculated on a cost per linear foot of pipe basis.

I found list prices from a leading cast iron foundry showing costs for 10-foot sections of no hub cast iron pipes. Note that from the reasoning section, PVC pipes can carry ~20% more water when compared to the same size cast iron pipes because of a smoother interior. Here are the costs for convenience on how the number above was guesstimated:

- 2" x 10' pipe --> $174

- 3" x 10' --> $240

- 4" x 10' --> $312

- 5" x 10' --> $449

- 6" x 10' --> $536

- 8" x 10' --> $834

- 10" x 10' --> $1,417

- 12" x 10' --> $2,059

- 15" x 10' --> $3,010

Note that the proposed code change will not require a certain material to be used, but with the differentiation of sizes between PVC and cast iron, more engineers may opt to use PVC pipe as a cost savings measure. To which, this cost impact analysis would be useless as pipe material change adds a certain degree of complexity. If the engineer uses PVC in all storm drain systems, then there would not be a cost impact.

Estimated Life Cycle Cost Impact:

no change

Attached Files

- **Storm Rationale Method_04-Storm Drainage Calc.xls**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4371/
- **Storm Rationale Method_04-Storm Drainage Calc.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4370/
- **Manning's Roughness Coefficients.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4369/
- **Manning Formula_proving code is based on Manning.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4368/
- **Manning Formula_pipe flow_PVC.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4366/
- **Manning Formula_pipe flow_new cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4365/
- **Manning Formula_pipe flow_aged cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4364/
- **Manning Formula_pipe flow and velocities.xlsx**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4363/
- **Manning Formula_pipe flow_coversheet.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4362/

P152-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The language is unenforceable and is more prescriptive that what is required. (14-0)

P152-24

Individual Consideration Agenda

Comment 1:

IPC: 1106.2, 1106.2.1, 1106.2.2, 1106.2.3, 1106.2.3.1 (New), 1106.2.3.2 (New), 1106.2.4

Proponents: Emily Lorenz, self (emilyblorenz@gmail.com); Christopher Winnie, self (chris.winnie@smithgroup.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

1106.2 Size of storm drain piping. ~~The size of~~ Vertical and horizontal storm drain piping shall be sized in accordance with Sections 1106.2.1 through 1106.2.4, and shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The horizontal sloped drains and vertical storm drain piping shall be sized to accommodate the volumetric flow rate of storm drainage, assuming all roof drains are at full capacity simultaneously.

1106.2.1 Maximum storm water demand. The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) volumetric flow rate (Q) in accordance with Equation 11-1.
Q = C x R x A x 0.0104 (Equation 11-1)
Where: C = Discharge Coefficient, the roughness of the roof's surface.

Q = Flow rate in gallons per minute (L/m)

R = Rainfall intensity in inches (mm) per hour.

A = Projected roof area in square feet (m)

The volumetric flow rate of storm drainage shall be the sum of the connected roof drain(s). The total connected load shall be used as the basis for pipe sizing, assuming all roof drains are at full capacity simultaneously.

1106.2.2 Sizing. Storm drain pipe sizing shall be sized in accordance with one of the following:

1. Horizontal p ~~P~~ipe sizing tables or equations in accordance with Section 1106.2.3 and vertical pipe sizing table in accordance with Section 1106.2.4
2. The sizing tables included in a listed piping system's manufacturer's installation instructions
3. Engineering methods.

1106.2.3 Horizontal s~~S~~izing tables and equations. This section applies to horizontal drainage systems using building gravity. Pipes for horizontal drainage systems shall be sized in accordance with Section 1106.2.3.1 or Section 1106.2.3.2. ~~Where the drainage system material is known, Tables 1106.2.3(1), 1106.2.3(2) and 1106.2.3(3) shall be used to size drainage piping.~~
~~Where Equation 11-1 is used to determine the expected flow rate seen at a roof drain, or building drain.~~

~~Where Equations 11-2, 11-3 and 11-4 are used to size drainage piping based on the drainage pipe material used.~~

1. ~~The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1, The Rational Method.Q = C x R x A x 0.0104 (Equation 11-1)~~
   ~~Where: C = Discharge Coefficient, *the roughness of the roof's surface*. Use 1.0 unless permitted by the local authority to factor in roof roughness for primary storm drainage. Secondary drainage shall use 1.0 in all cases.~~
   ~~Q = Flow rate in gallons per minute (L/m)~~
   ~~R= Rainfall intensity in inches (mm) per hour.~~
   ~~A = Projected roof area in square feet (m^2)~~
2. ~~The flow rates for horizontal sloped drains shall be calculated by use of the Flow Rate Equation and the Manning Equation based on full flow for pipe diameters of a given material, or coefficient of roughness.~~

   ~~The Flow Rate Equation, Equation 11-2~~
   ~~Q = A x V (Equation 11-2)~~

   ~~Where: Q = Flow rate in gallons per minute (L/m)~~
   ~~A = Cross-sectional area of the full flow~~

   ~~V = Velocity of flow, feet per second (L/s)~~

   ~~The Manning Equation, Equation 11-3~~
   ~~$V = (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-3)~~
   ~~Where: V = Velocity of flow, feet per second (m/s)~~

   ~~k = unit conversion factor, 1.486 in English units~~

   ~~n = roughness (Manning) coefficient~~

   ~~R = hydraulic radius of pipe, ft (m); for full flow pipe, use radius of the pipe~~

   ~~S = slope of pressure gradient~~

   ~~The modified Flow Rate Equation, Equation 11-4~~
   ~~$Q = A \times (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-4)~~

Add new text as follows:

1106.2.3.1 Horizontal sizing tables. Tables 1106.2.3(1), 1106.2.3(2) and 1106.2.3(3) shall be used to size horizontal drainage piping for the appropriate drainage pipe material.

1106.2.3.2 Horizontal sizing equations. Horizontal drainage piping shall be sized based on Equations 11-2, 11-3, and 11-4 and the drainage pipe material used.

The flow rates for horizontal sloped drains shall be calculated by use of the Flow Rate Equation and the Manning Equation based on full flow for pipe diameters of a given material, or coefficient of roughness.

The Flow Rate Equation, Equation 11-2

$Q = A \times V$ (Equation 11-2)

Where: Q = Flow rate in gallons per minute (L/m)

A = Cross-sectional area of the full flow

V = Velocity of flow, feet per second (L/s)

The Manning Equation, Equation 11-3

$V = (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-3)

Where: V = Velocity of flow, feet per second (m/s)

k = unit conversion factor, 1.486 in English units

n = roughness (Manning) coefficient

R = hydraulic radius of pipe, ft (m); for full flow pipe, use radius of the pipe

S = slope of pressure gradient

The modified Flow Rate Equation, Equation 11-4

$Q = A \times (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-4)

Revise as follows:

1106.2.4 Vertical sizing table. Vertical storm drain piping shall be sized for the expected volumetric flow rate through the roof drain(s). The volumetric flow rate, as calculated in accordance with Section 1106.2.~~2~~1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The storm drain piping shall not exceed that specified in Table 1106.2.4.

Reason: Many of the changes proposed revert language in the original charging language to what is currently in the IPC. No changes were made to the tables in the original proposal, so those tables are not included within this code change. In response to the Committee's Reason for disapproval based on "language is unenforceable and is more prescriptive than what is required"

The proposed changes mirror those in the current edition of International Fuel Gas Code (IFGC) for sizing of natural gas and propane systems. The IFGC has used the same prescriptive formulas for multiple code cycles. For these reasons, we feel that the language is enforceable. However, I am open to specific modifications that the committee feels would improve the language. The provided Tables for PVC and new cast iron are included so engineers and inspectors can more quickly confirm appropriate pipe sizes, similar to how the IFGC is enforced.

It is important that the engineers, designers and other entities referring to the code have the most accurate data available. Friction plays a pivotal role in the flow/movement of mass including fluids, gasses, electric current or physical items. The formulas calculating the flow/movement of mass use pressure drop, voltage or force as a variable to define the amount of friction opposing the movement of the mass. There is no mass moving on Earth that is able to avoid friction losses. It is known that plastic pipes have a smoother interior than metallic pipes. There are known friction coefficients that we can use to calculate the impact of friction on the flow of storm water within a pipe. Not all Storm Drain systems use plastic (PVC/ABS) and not all systems use cast iron, so it would be of most use to the industry if the Tables in Chapter 11 for Storm Drain Pipe Sizing included sizing criteria for both plastic and metallic piping.

In the most recent edition of International Plumbing Code (2024), Table 1106.2 Storm Drain Pipe Sizing is the only table listed to size drain pipes within and below a building. IPC does not currently alter sizing criteria for the pipes based on friction. This code change assists the user in correcting pipe sizes for friction.

In referencing the “Manning Formula, proving code is based on Manning.pdf” in the original code-change proposal, we see the IPC (2015-2024) flow rates for horizontal storm piping highlighted in forest green. The Manning equation calculated flow rate for the same size horizontal storm pipes are highlighted in a lighter green. A simple comparison between the flow rates defined in code and my own calculated flow rates (assuming 0.010 for pipe friction; PVC) is highlighted in a light red color. It can be seen the accuracy between the code and my own calculations are more than 95% accurate. Use of different friction coefficients can be used to determine the appropriate maximum flow rate that a pipe of (any) size and (any) material can carry.

In May of 2024, a peer reviewed white paper, IAPMO/ASPE WHITE PAPER 2-2024 ‘Capacities of Stacks and Horizontal Drains in Storm Drainage Systems’, was released. The paper demonstrates a strong correlation between pipe material and draining flow rates. The adjusted equations in this code-change proposal agree with those presented in the peer-reviewed IAPMO/ASPE white paper.

In 2025, ASPE will open a task group to amend conflicts with the current ASPE Tables on storm drain pipe sizes and the conclusions found in the referenced white paper and the findings shared in this proposal.

Bibliography: See references in original code-change proposal.

In addition, the IAPMO/ASPE White Paper 2-2024, "Capacities of Stacks and Horizontal Drains in Storm Drainage Systems," is available through IAPMO.

Cost Impact: Increase

Estimated Immediate Cost Impact:

See original code-change proposal.

Estimated Immediate Cost Impact Justification (methodology and variables):

See original code-change proposal.

Attached Files

- **Manning Formula_pipe flow_coversheet.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8043/
- **Manning Formula_pipe flow and velocities.xlsx**
  https://www.cdpaccess.com/comment/39/32873/files/download/8042/
- **Manning Formula_pipe flow_aged cast iron.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8041/
- **Manning Formula_pipe flow_new cast iron.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8040/
- **Manning Formula_pipe flow_PVC.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8039/
- **Manning Formula_proving code is based on Manning.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8038/
- **Manning's Roughness Coefficients.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8037/
- **Storm Rationale Method_04-Storm Drainage Calc.pdf**
  https://www.cdpaccess.com/comment/39/32873/files/download/8036/

- **Storm Rationale Method_04-Storm Drainage Calc.xls**
  https://www.cdpaccess.com/comment/39/32873/files/download/8035/

Comment (CAH2)# 39

Comment 2:

Proponents: Christopher Winnie, self (chris.winnie@smithgroup.com) requests As Submitted

Reason: In response to the Committee's Reason for disapproval based on "language is unenforceable and is more prescriptive than what is required"

The proposed changes mirror those in the current edition of International Fuel Gas Code (IFGC) for sizing of natural gas and propane systems. The IFGC has used the same prescriptive formulas for multiple code cycles. For these reasons, we feel that the language is enforceable. However, I am open to specific modifications that the committee feels would improve the language. The provided Tables for PVC and new cast iron are included so engineers and inspectors can more quickly confirm appropriate pipe sizes, similar to how the IFGC is enforced.

It is important that the engineers, designers and other entities referring to the code have the most accurate data available. Friction plays a pivotal role in the flow/movement of mass including fluids, gasses, electric current or physical items. The formulas calculating the flow/movement of mass use pressure drop, voltage or force as a variable to define the amount of friction opposing the movement of the mass. There is no mass moving on Earth that is able to avoid friction losses. It is known that plastic pipes have a smoother interior than metallic pipes. There are known friction coefficients that we can use to calculate the impact of friction on the flow of storm water within a pipe. Not all Storm Drain systems use plastic (PVC/ABS) and not all systems use cast iron, so it would be of most use to the industry if the Tables in Chapter 11 for Storm Drain Pipe Sizing included sizing criteria for both plastic and metallic piping.

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In referencing the attached "Manning Formula, proving code is based on Manning.pdf", we see the IPC (2015-2024) flow rates for horizontal storm piping highlighted in forest green. The Manning equation calculated flow rate for the same size horizontal storm pipes are highlighted in a lighter green. A simple comparison between the flow rates defined in code and my own calculated flow rates (assuming 0.010 for pipe friction; PVC) is highlighted in a light red color. It can be seen the accuracy between the code and my own calculations are more than 95% accurate. Use of different friction coefficients can be used to determine the appropriate maximum flow rate that a pipe of (any) size and (any) material can carry.

In May of 2024, a peer reviewed white paper, IAPMO/ASPE WHITE PAPER 2-2024 'Capacities of Stacks and Horizontal Drains in Storm Drainage Systems', was released. The paper demonstrates a strong correlation between pipe material and draining flow rates. The adjusted equations in this code-change proposal agree with those presented in the peer-reviewed IAPMO/ASPE white paper.

In 2025, ASPE will open a task group to amend conflicts with the current ASPE Tables on storm drain pipe sizes and the conclusions found in the referenced white paper and the findings shared in this proposal.

BASED ON CHAPTER 1 OF ASPE VOLUME 2 2018-19

PROJECT NAME: Manning Formula

PROJECT NUMBER: xxxxx.xxx

Manning formula --> V = (k/n) * R^2/3 * S^1/2

Flow formula --> Q = A * V

where:

Q = quantity rate of flow; cubic feet per second

A = Cross-sectional area of flow, ft^2

V = velocity of flow, feet per second

R = hydraulic radius of pipe, ft

S = slope of pressure gradient

C = Hazen-Williams coefficient

n = manning coefficient, (varies with pipe roughness)

k = unit conversion factor, 1.486 in english units

2012 IPC (assumed cast iron 0.0151 and 1% slope)

pipe Ø (inches)	Pipe slope (inches per ft)	n	k
3.00	0.125	0.01510	1.486
4.00	0.125	0.01510	1.486
5.00	0.125	0.01510	1.486
6.00	0.125	0.01510	1.486
8.00	0.125	0.01510	1.486
10.00	0.125	0.01510	1.486
12.00	0.125	0.01510	1.486
15.00	0.125	0.01510	1.486

Velocity (ft/sec)	Q, flow (gpm)	2012 flowrate (GPM)	% accuracy
1.58	34.82	34	97.6%
1.92	75.06	75	99.9%
2.22	138.08	139	102.1%
2.61	221.29	223	100.8%
3.04	478.51	479	100.5%
3.53	884.08	863	99.9%
3.99	1405.10	1388	98.8%
4.63	2547.61	2479	97.3%

2021 IPC (assumed PVC 0.010 and 1% slope)

3.00	0.125	0.010	1.486
4.00	0.125	0.010	1.486
5.00	0.125	0.010	1.486
6.00	0.125	0.010	1.486
8.00	0.125	0.010	1.486
10.00	0.125	0.010	1.486
12.00	0.125	0.010	1.486
15.00	0.125	0.010	1.486

		2015 flowrate (GPM)	
2.39	52.65	55	104.5%
2.89	113.33	115	101.5%
3.36	205.40	165	80.3%
3.79	334.15	344	102.9%
4.59	719.60	714	99.2%
5.33	1304.77	1311	100.5%
6.02	2121.66	2093	98.6%
6.96	3848.66	3546	92.2%

The accuracy of this comparison between 2012 IPC, 2021 IPC and the use of Manning formula and Rational Method is very accurate. Except for the 5" pipe

Bibliography: Engineers Edge, https://www.engineersedge.com/fluid_flow/piperoughness.htm (October 23, 2023)
The section headers and wording used was mirrored from the *International Fuel Gas Code* as it defined gas pipe sizing (section 402), with obvious differences for the different system

Cole, Daniel P. and Lohr, Christoph. (2024). Capacities of Stacks and Horizontal Drains in Storm Drainage Systems *IAPMO/ASPE* WHITE PAPER 2-2024

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Manning Formula_proving code is based on Manning.pdf**
  https://www.cdpaccess.com/comment/461/32880/files/download/8044/

Comment (CAH2)# 461

P157-24 Part I

IPC: SECTION 202, SECTION 202 (New), CHAPTER 13, 1301.1, 1301.2, TABLE 1301.2(1) (New), TABLE 1301.2(2) (New), TABLE 1301.2(3) (New), 1301.2.1, 1301.2.2, 1301.3, 1301.4, 1301.5, 1301.6, 1301.7, 1301.8, 1301.9, 1301.9.1, 1301.9.2, 1301.9.3, 1301.9.3.1, 1301.9.3.2, 1301.9.4, 1301.9.5, 1301.9.6, 1301.9.7, 1301.9.8, 1301.9.9, 1301.9.10, 1301.10, 1301.10.1 (New), 1301.10.2 (New), 1301.10.3 (New), 1301.11, 1301.12, 1301.13 (New), SECTION 1302, 1302.1, 1302.2, 1302.2.1, 1302.4 (New), 1302.3, 1302.4, 1302.4.1, 1302.4.2, 1302.4.3, 1302.4.4, 1302.5, 1302.8 (New), 1302.6, 1302.6.1, 1302.7, 1302.7.1, 1302.7.2, 1302.8, 1302.8.1, 1302.8.2, 1302.9, 1302.10, 1302.11, 1302.11.1, 1302.11.2, 1302.11.3, 1302.12, 1302.12.1, 1302.12.2, 1302.12.3, 1302.12.4, 1302.12.5, 1302.12.6, 1302.14.7 (New), 1302.13, 1302.13.1, 1302.13.2, 1302.13.3, 1302.13.4, DOE (New), (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating wastewater and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Revise as follows:

CHAPTER 13
~~NONPOTABLE~~ WATER REUSE SYSTEMS

1301.1 General. The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the ~~collection~~ treatment, storage, ~~treatment~~ and distribution of ~~nonpotable~~ reuse water. ~~For nonpotable rainwater systems, the~~ The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution ~~of nonpotable water~~. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction. ~~The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction~~.

1301.2 ~~Water~~ Reuse water quality. ~~Nonpotable~~ Reuse water ~~for each end use application~~ quality shall meet the minimum ~~water quality~~ requirements as specified in Tables 1301.2(1), 1301.2(2), 1301.2(3), and as established for the intended application by ~~the~~ all applicable laws, rules and ordinances ~~applicable in~~of the jurisdiction. Where ~~nonpotable~~ water from ~~different~~multiple sources is combined ~~in a system~~, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

Add new text as follows:

TABLE 1301.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]	Quality Tier[b]
Direct Potable Reuse	Direct Potable Reuse	DC	4
Indirect Potable Reuse	Aquifer Recharge - Direct Injection	IC	2
(Treatment Follows Reuse Application)	Aquifer Recharge - Surface Application	IC	2
	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
	Infiltration/Percolation Lagoons	IC	2
	Raw Water Augmentation	IC	2
	Saltwater Intrusion Barrier	IC	2
	Surface Water Augmentation to a Supply Source	IC	2
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop with processing that destroys pathogens (Restricted Access)	LC	1
	Orchards and Vineyards	AC/LC	4/1
	Water contacts edible portion of food crop (Includes Root Crops)	AC	4
	Water doesn't contact edible portion of food crop (Restricted Access)	IC	2
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC	3/1
	Hemp Crops	AC/LC	3/1
	Fiber crops	AC/LC	3/1
	Fodder /Feed Crop/ Forage Crops	AC/LC	3/1
	Ornamental nursery stock	AC/LC	3/1
	Seed Crops	AC/LC	3/1
	Silviculture / Tree Farms	AC/LC	3/1
	Sod/Turf Crops	AC/LC	3/1
	Tobacco	AC/LC	3/1
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC	3/1
	Cemeteries	AC/LC	3/1
	College and University Campuses	AC/LC	3/1
	Commercial Campuses	AC/LC	3/1
	Golf Courses (Restricted Access)	LC	1
	Golf Courses (Unrestricted Access)	AC/LC	3/1
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC	3/1
	Open Access Land Irrigation	AC/LC	3/1
	Pasture for Milk Producing Animals (Restricted Access)	LC	1
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC	1
	Parks	AC/LC	3/1
	Playgrounds	AC/LC	3/1
	Residential Irrigation	AC/LC	3/1
	Landscape Irrigation (Restricted Access)	LC	1
	Urban Landscaping	AC/LC	3/1
	Schoolyards	AC/LC	3/1
Water Features	Decorative Fountains	AC	3
	Landscape Impoundments (With Fountain(s))	AC	3
	Landscape Impoundments (Without Fountain(s))	LC	1
	Ponds and Lagoons	LC	1
	Recreational Impoundments (Restricted Access)	LC	1
	Recreational Impoundments (Unrestricted Access)	AC	3
	Reservoir Augmentation (Recreational)	AC	3
	Wetland Creation	LC	1
	Wetland Discharge / Application	LC	1
	Fire Fighting Via Plane	AC	3
	Fire Hydrant Water Supply	AC	3
	Fire Protection systems	AC	3
Life Safety	Non Structural Fire Fighting	AC	3

	Structural Fire Fighting	AC	3
	Concrete and Cement mixing	LC	1
Construction	Dust Control	LC	1
	Equipment Operation (Ex. Cooling Power Equipment)	LC	1
	Material Washing and Sieving	LC	1
	Soil Compaction and Consolidation	LC	1
	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
Process Water	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	1
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	3
	Cooling systems with aerosolization	AC	1
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	1
Process Water	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	AC	3
	Pressure Washing	AC	3
	Priming Drainage Traps	LC	1
	Road Milling	LC	1
	Ship Ballasting	LC	1
	Snow Making (Commercial / Recreational Use)	AC	3
	Snow Making (Storage)	AC	3
	Stack Scrubbing	LC	3
	Stream Flow Augmentation	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
	Vehicle and equipment Washing	AC	3
	Wastewater Treatment (Process Uses)	LC	1
	Window Washing	AC	3

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited

Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE 1301.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimun Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances and NSF 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

TABLE 1301.2(3) LOG REDUCTION (LRV) CREDITS APPLICALBLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0
Blackwater blended with groundwater [a]	LRV credit [b] = negative log of BWC
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	LRV credit [b] = negative log of BWC
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process Water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

Delete without substitution:

~~**1301.2.1 Residual disinfectants.** Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine when tested in accordance with ASTM D1253. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use. **Exception:** Reclaimed water sources shall not be required to comply with these requirements.~~

~~**1301.2.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron (0.1 mm) or finer filter. **Exception:** Reclaimed water sources shall not be required to comply with these requirements.~~

Revise as follows:

1301.3 Signage required. ~~Nonpotable~~ Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets, each outlet shall be identified at the point of use ~~for each outlet~~ with signage that reads as follows: ~~"Nonpotable water is utilized for [application name].~~ CAUTION: NONPOTABLE WATER – DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required ~~wordage~~ text, the pictograph shown in Figure 1301.3 shall appear on the signage required by this section.

1301.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of ~~nonpotable~~ water reuse systems. Construction documents, engineering calculations, diagrams, operations and maintenence manuals,and other such data pertaining to the ~~nonpotable~~ water reuse systems shall be submitted with each permit application.

1301.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section 608.

Revise as follows:

1301.6 Components and materials. Piping, plumbing components and materials used in ~~collection and~~ conveyance and distibution systems shall be of material approved ~~by the manufacturer~~ for the intended application.

1301.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

1301.8 Freeze protection. Where ~~sustained~~ freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment and the related piping from freezing.

1301.9 ~~Nonpotable water storage~~ Water tanks. ~~Nonpotable w~~Water storage and process tanks shall comply with Sections 1301.9.1 through 1301.9.10.

1301.9.1 Location. Any storage tank, process tank and equipment
or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, ~~wood,~~ or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

1301.9.2 Materials. ~~Where collected on site,~~ Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The ~~storage~~ tank shall be constructed of materials compatible with ~~any~~ all disinfection systems used to treat water upstream of the tank and with ~~any~~all systems used to maintain water quality in the tank. ~~Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

1301.9.3 Foundation and supports. ~~Storage~~ All tanks shall be supported on a firm base capable of withstanding the weight of the ~~storage~~ tank when filled to capacity. ~~Storage t~~Tanks shall be supported in accordance with the *International Building Code*.

1301.9.3.1 Ballast. Where the soil can become saturated, an underground ~~storage~~ tank shall be ballasted, or otherwise secured, to ~~prevent the tank from floating out of the ground~~ resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall ~~meet or~~ exceed the buoyancy force ~~of~~ applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the ~~storage~~ tank when full, consistent with the bearing capability of adjacent soil.

1301.9.3.2 Structural support. Where installed below grade, ~~storage~~ tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

1301.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, ~~potable or reclaimed water shall be provided as a~~an additional source of makeup water shall be provided for the storage tank. ~~The~~ All makeup water supply~~y~~ies shall be protected against backflow in accordance with Section 608. A *full-open valve* located on the makeup water supply lines to the storage tank ~~shall be provided~~. ~~Inlets to~~ Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. ~~Where makeup water is provided,~~ tThe water level shall not be permitted to drop below the ~~source water inlet or the~~ intake of any ~~attached~~ pump supplying makeup water.

1301.9.5 Overflow. ~~The storage t~~Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table ~~606.5.4~~ 606.5(4). The overflow pipe shall be protected from insects ~~or~~ and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade ~~storage~~ tanks, located outside of the building, shall be provided with ~~a manhole~~ an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). ~~Manholes~~ Access opening shall extend not less than 4 inches (102 mm) above ground ~~or~~ and shall be designed to prevent water infiltration. ~~Finished~~ The finished grade shall be sloped away from the ~~manhole~~ maintenance hole to divert surface water. ~~Manhole~~ Access opening covers shall be secured to prevent unauthorized access. Service ports in ~~manhole~~ access opening covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled “CONFINED SPACE.”

Exception: ~~Treated water storage t~~Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with a manhole an access opening provided that the tank has a service port of not less than 8 inches (203 mm) in diameter.

1301.9.7 Venting. ~~Storage t~~Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the ~~storage~~ tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1301.7.

1301.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table ~~606.5.7~~ 606.5(7). Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708.

Revise as follows:

1301.9.9 Marking and signage. Each nonpotable water ~~storage~~ tank shall be labeled with its rated volumetric capacity. The contents of ~~storage~~ tanks shall be identified with the words “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1301.9.10 ~~Storage t~~Tank tests. ~~Storage~~ Pressurized tanks shall be be certified in accordance with Section 303.4. Tanks that receive flow by gravity shall tested in accordance with the following: ~~Storage t~~Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

1301.10 System abandonment. If the owner of an on-site ~~nonpotable~~ water reuse system or ~~rainwater collection and conveyance system~~ components thereof, elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with ~~the following:~~ Sections 1301.10.1 through 1301.10.3.

1. ~~All system piping connecting to a utility-provided water system shall be removed or disabled.~~
2. ~~The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.~~
3. ~~The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.~~

Add new text as follows:

1301.10.1 Utility-Connected Piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

1301.10.2 Distribution Piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

1301.10.3 Tanks. Tanks shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

Revise as follows:

1301.11 Trenching requirements for nonpotable water piping. Nonpotable water ~~collection and~~ distribution ~~piping and reclaimed water~~ piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water ~~collection and~~ distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section 306. **Exceptions:**

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the *sewer* is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table 702.3.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table 605.4.
3. Nonpotable water pipe is permitted to be located in the same trench with a *building sewer*, provided that such *sewer* is constructed of materials that comply with the requirements of Table 702.2.
4. The required separation distance shall not apply where a nonpotable water pipe crosses a *sewer* pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the *sewer* pipe centerline on both sides of such crossing, with pipe materials that comply with Table 702.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table 702.2.
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

1301.12 Outdoor outlet access. Sill cocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section 1301.3.

Add new text as follows:

1301.13 Operations and monitoring. The design, installation, and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

Revise as follows:

SECTION 1302
~~ON-SITE NONPOTABLE~~ WATER REUSE SYSTEMS

1302.1 General. The provisions of ASTM E2635 and Section 1302 shall govern the construction, installation, alteration and repair of water reuse systems. ~~on-site nonpotable water reuse systems for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction water reuse systems.~~.

1302.2 Graywater ~~S~~sources. ~~On-site nonpotable water~~ Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers ~~and laundry trays~~ , laundry trays, condensate, and other domestic wastewaters that are not expected to contain urine, fecal matter, grease, or food wastes. ~~Where *approved* and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.~~.

1302.3 ~~1302.2.1 Prohibited~~ Blackwater sources. ~~Wastewater containing urine or fecal matter~~ Blackwater shall ~~not~~ be ~~diverted to on-site nonpotable water reuse systems and shall discharge~~ discharged to the sanitary drainage system ~~of the building or premises~~ in accordance with Chapter 7~~. Reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet hood scrubbers shall not be collected for reuse in an on-site nonpotable water~~or to an approved on-site blackwater reuse system.

Add new text as follows:

1302.4 Other sources.. Other sources including, but not limited to, condensate, reverse osmosis system reject water, water softener discharge water, and wastewater discharged from wet-hood scrubbers shall also be considered for use in a water reuse system.

Revise as follows:

1302.5 ~~1302.3~~ Traps. Traps serving fixtures and devices discharging ~~wastewater to on-site nonpotable~~ water to water reuse systems shall comply with Section 1002.4.

Delete without substitution:

~~**1302.4 Collection pipe.** On-site nonpotable water reuse systems shall utilize drainage piping *approved* for use in plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use in plumbing venting systems shall be utilized for vents in the graywater system. Collection and vent piping materials shall comply with Section 702.~~

~~**1302.4.1 Installation.** Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.~~

~~**1302.4.2 Joints.** Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section 705.~~

~~**1302.4.3 Size.** Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.~~

Revise as follows:

1302.6 ~~1302.4.4~~ Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1302.7 ~~1302.5~~ ~~Filtration~~ Treatment. ~~Untreated w~~Water collected for reuse shall be ~~filtered as required for the intended end use. Filters shall be provided with *access* for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~treated to meet the quality standards required in Tables 1301.2(1) and 1301.2(2).

Add new text as follows:

1302.8 Treatment systems.. Treatment systems shall be installed to allow access for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters, or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

Revise as follows:

1302.9 ~~1302.6~~ ~~Disinfection and treatment~~ Tanks. ~~Where the intended application for nonpotable water collected on-site for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Nonpotable water collected on-site containing untreated graywater shall be retained in collection reservoirs for not longer than 24 hours.~~ Nopotable tanks utilized in water reuse systems shall comply with Sections 1301.9, 1302.8.1 and 1302.8.2.

Delete without substitution:

~~**1302.6.1 Graywater used for fixture flushing.** Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.~~

~~**1302.7 Storage tanks.** Storage tanks utilized in on-site nonpotable water reuse systems shall comply with Sections 1301.9, 1302.7.1 and 1302.7.2.~~

Revise as follows:

1302.9.1 ~~1302.7.1~~ Location. ~~Storage t~~Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1302.7.1~~ 1302.7(1).

1302.9.2 ~~1302.7.2~~ Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the ~~storage~~ tank and shall not skim water from the surface.

1302.10 ~~1302.8~~ Valves. Valves shall be ~~supplied~~ installed on ~~on-site nonpotable~~ the collection of the water reuse systems in accordance with Sections 1302.~~8~~ 9.1 and 1302.~~8~~ 9.2.

1302.10.1 ~~1302.8.1~~ Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, ~~or drain field,~~ as applicable, to divert untreated on-site reuse sources to the sanitary *sewer* or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow~~, connection and storage tank or drainfield connection~~. Bypass valves shall be provided with *access* that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

1302.10.2 ~~1302.8.2~~ Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section 714.

1302.11 ~~1302.9~~ Pumping and control system. Mechanical equipment including pumps, valves and ~~filters~~ treatment units shall have

access ~~and be removable~~ in order to ~~perform~~ to replace, repair, ~~maintenance~~ maintain and clean~~ing~~. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

1302.12 ~~1302.10~~ Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the ~~nonpotable~~ water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1302.13 ~~1302.11~~ Distribution piping. Distribution piping utilized in ~~on-site nonpotable~~ water reuse systems shall comply with Sections ~~1302.11.1~~ 1302.12.1 through ~~1302.11.3~~ 1302.12.3. **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventer.

~~1302.11.1~~ 1302.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section 605.

~~1302.11.2~~ 1302.13.2 Design. ~~On-site nonpotable w~~Water reuse distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

~~1302.11.3~~ 1302.13.3 Labeling and marking. ~~On-site n~~Nonpotable water distribution piping labeling and marking shall comply with Section 608.9.

1302.14 ~~1302.12~~ Tests and inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections 1302.12 14.1 through 1302.12 14.6.

1302.14.1 ~~1302.12.1~~ Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section 312.

1302.14.2 ~~1302.12.2~~ ~~Storage t~~Tank tests. ~~Storage t~~Tanks shall be tested in accordance with Section 1301.9.10.

1302.14.3 ~~1302.12.3~~ Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section 312.6.

1302.14.4 ~~1302.12.4~~ Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section 312.11.

1302.14.5 ~~1302.12.5~~ Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the ~~storage~~ tank and piping systems in accordance with Section 1301.7.

1302.14.6 ~~1302.12.6~~ Initial ~~W~~water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with ~~the requirements~~ all applicable laws, rules, and ordinances of the jurisdiction.

Add new text as follows:

1302.14.7 Operational water quality testing.. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

Revise as follows:

1302.15 ~~1302.13~~ Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections 1302.13.1 through 1302.13.4~~.~~ and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

1302.15.1 ~~1302.13.1~~ Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1302.15.2 ~~1302.13.2~~ Schematics. The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

1302.15.3 ~~1302.13.3~~ Maintenance procedures. The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

1302.15.4 ~~1302.13.4~~ Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

Add new text as follows:

Add new standard(s) as follows:

N/A. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

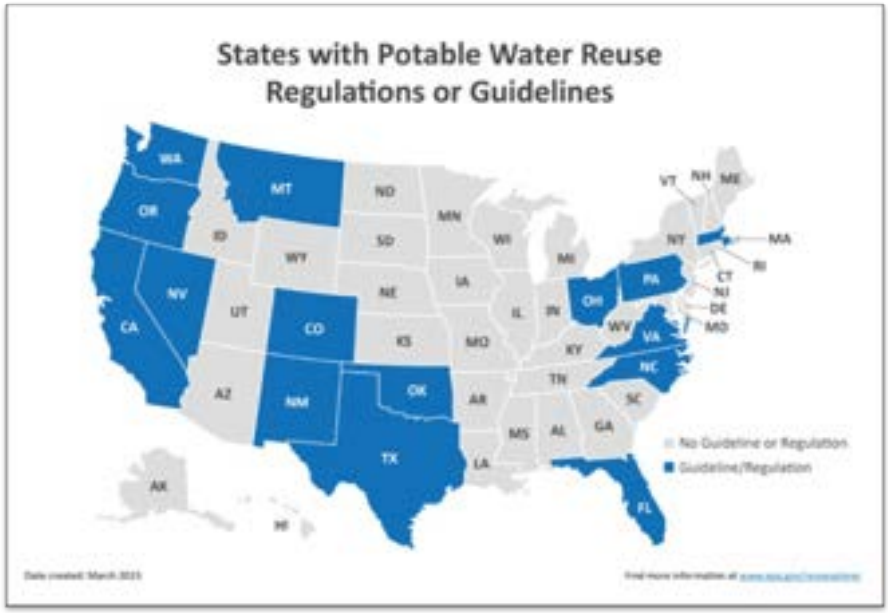
More detail is needed on blackwater reuse and related quality.

This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the practice is currently labeled "Advanced Water Purification" (AWP) instead of DPR.



Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality

standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

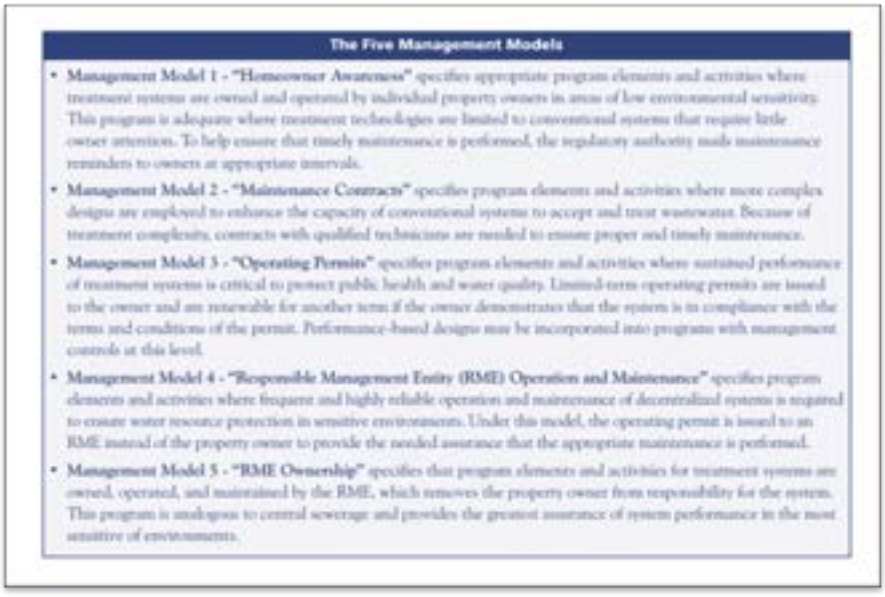
Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

These log reductions, mean that enteric viruses are reduced by 99.9999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.9999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality,and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)



SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

BWC = 10,000 / (10,000 + 70,000 + 20,000)

BWC = 0.10

LRV Credit = -log (BWC)

LRV Credit = -log (0.10)

LRV Credit = 1.0

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: Alsup, Kayla and Alsup, Kayla E., "Sustainable Water Treatment Systems: A Direct Potable Proposal" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), https://sfpuc.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects, accessed July 27, 2023.

Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141.

Ghernaout, D. , Elboughdiri, N. and Alghamdi, A. (2019) Direct Potable Reuse: The Singapore NEWater Project as a Role Model. Open Access Library Journal, 6, 1-10. doi: 10.4236/oalib.1105980.

Kehoe P. & Nokhoudian T. 2022 “Onsite Water Recycling: an Innovative Approach to Solving an Old Problem”. San Francisco, CA.

Leslie, Jacques., “Where Water is Scarce, Communities Turn to Reusing Wastewater,” Yale Environment 360, May 1, 2018.

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“Onsite Water Reuse Program Guidebook (2022)”, San Francisco Public Utilities Commission (SFPUC), accessed July 27, 2023.

”Potable reuse: Guidance for producing safe drinking-water.” Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO.

Rich, D., Andiroglu, E., Gallo, K., & Ramanathan, S. (2023). A Review of Water Reuse Applications and Effluent Standards in Response to Water Scarcity. *Water Security*. Accepted through Peer Review July 2023.

Sharvelle, S.; Ashbolt, N.; Clerico, E.; Hultquist, R.; Leverenz, H.; and A. Olivieri. (2017). “Risk-Based Framework for the Development of

Public Health Guidance for Decentralized Nonpotable Water Systems." Prepared by the National Water Research Institute for the Water Environment & Reuse Foundation. Alexandria, VA. WE&RF Project No. SIWM10C15.

Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., Wastewater engineering : treatment and reuse. (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility's rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about $50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P157-24 Part I

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This is a big leap forward for water reuse. This will encourage more technology to be developed. There is already overseas widespread use of all waters for applications. (10-4)

P157-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: TABLE 1301.2(1)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

TABLE 1301.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Portions of table not shown remain unchanged.

Use Category	Application	Exposure[a]	Quality Tier[b]
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	1
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	3
	Cooling systems with aerosolization	AC	1
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	1
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	~~AC~~ DC	~~3~~ 4
	Pressure Washing	AC	3
	Priming Drainage Traps	LC	1
	Road Milling	LC	1
	Ship Ballasting	LC	1
	Snow Making (Commercial / Recreational Use)	AC	3
	Snow Making (Storage)	AC	3
	Stack Scrubbing	LC	3
	Stream Flow Augmentation	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
	Vehicle and equipment Washing	AC	3
	Wastewater Treatment (Process Uses)	LC	1
	Window Washing	AC	3

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited

Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

Reason: Swimming pools and spas require potable water for startup and makeup water because water chemistry is extremely important for the safety of the users (bathers.)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 33 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Potable water is almost always readily available at the site location where pools and spas are constructed and used. As no treatment is needed for a potable water supply, the cost of potable water will likely be less than if lesser quality waters needed extensive treatment to make potable water.

Comment (CAH2)# 144

Comment 2:

IPC: 1301.2

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International (kthompson@safeplumbing.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Plumbing Code

Revise as follows:

1301.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables 1301.2(1), 1301.2(2), 1301.2(3), and as established for the intended application by all applicable laws, rules and ordinances of the jurisdiction. Where water from multiple sources is combined , the system shall comply with the most stringent of the requirements of this code that are applicable to such sources. For Group R occupancies, where an alternate nonpotable water source for use in toilet flushing is installed, a potable water distribution line rough-in, sized in accordance with Section 604,that includes a shutoff valve located where the line originates, shall be provided at each toilet.

Reason: See CAH1 Proposal P155-24 for extended substantiation supporting the need for potable water use in smart toilets and personal hygiene devices. This proposed change only applies to buildings that chose to plumb non-potable water indoors specifically for toilet flushing. It would require a potable water supply line to be roughed in when the non-potable water supply line is installed to address smart toilets and personal hygiene devices. Smart toilets (See Figure 1) are those which include an integrated bidet feature and personal hygiene devices (See Figure 2) are an add on or toilet seat incorporating a bidet feature. When a residential building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation. This can be expensive after move-in but can be economically addressed during initial construction. Personal hygiene devices and smart toilets are crucial for many Americans with medical conditions, special needs or limited mobility. An allowance in the existing code to include provisions for these products is important to ensuring public health and safety. The water quality used with smart toilets and personal hygiene devices must be free of any pathogens that could cause infection or disease and, therefore, must be treated at a minimum in accordance with regulations for potable water.
Figure 1: Smart Toilet

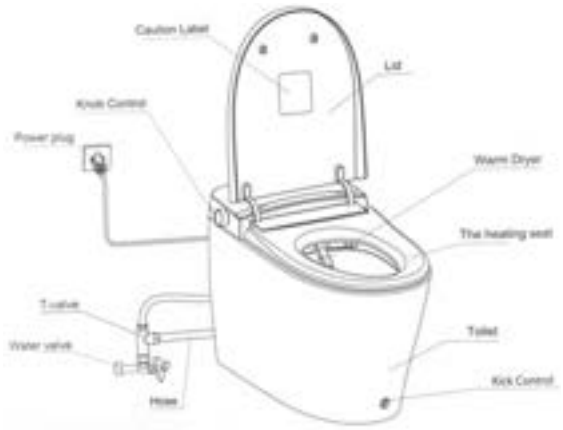


Figure 2: Personal Hygiene Device Connection

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $215 for rough in of potable water supply line.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line that is dry until in use:

i. Parts: 2 shutoff valves ($40 ea.), 20 ft copper pipe ($60),

ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).

iii. Total $215

Estimated Life Cycle Cost Impact:

Savings of $735 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

i. Construction

1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450)

ii. Plumbing

1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60),
2. Plumbing Labor: $150/hr
3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400)

iii. Permit: $100

iv. Total $950 for re-pipe after construction.

Comment (CAH2)# 215

P157-24 Part II

IRC: SECTION R202, SECTION 202 (New), SECTION P2910, P2910.1, P2910.2, P2910.2.1, P2910.2.2, P2910.3, FIGURE P2910.3, P2910.4, P2910.5, P2910.6, P2910.7, P2910.8, P2910.9, P2910.9.1, P2910.9.2, P2910.9.3, P2910.9.4, P2910.9.4.1, P2910.9.4.2, P2910.9.5, P2910.9.5.1, P2910.9.6, TABLE P2910.9.6, P2910.9.7, P2910.9.8, SECTION P2911, P2910.9.9, P2910.10, P2910.11, P2910.12, P2910.13, P2910.14, P2911.1, P2911.2, P2911.2.1, P2911.3, P2911.4, P2911.4.1, P2911.4.2, P2911.4.3, P2911.4.4, P2911.5, P2911.6, P2911.6.1, P2911.7, P2911.7.1, TABLE P2911.7.1, P2911.7.2, P2911.7.3, P2911.8, P2911.8.1, P2911.8.2, P2911.9, P2911.10, P2911.11, P2911.11.1, P2911.11.2, P2911.11.3, P2911.12, P2911.12.1, P2911.12.2, P2911.12.3, P2911.12.4, P2911.12.5, P2911.12.6, P2911.13, P2911.13.1, P2911.13.2, P2911.13.3, P2911.13.4, SECTION P2912, P2912.1, P2912.2, P2912.3, P2912.4, P2912.5, P2912.5.1, P2912.5.2, P2912.6, P2912.7, P2912.7.4, P2912.7.2, P2912.7.3, P2912.7.1, P2912.8, P2912.9, P2912.10, P2912.10.1, TABLE P2912.10.1, P2912.10.2, P2912.10.3, P2912.11, P2912.11.1, P2912.11.2, P2912.12, P2912.13, P2912.14, P2912.14.1, P2912.14.2, P2912.14.3, P2912.15, P2912.15.1, P2912.15.2, P2912.15.3, P2912.15.4, P2912.15.5, P2912.15.6, P2912.15.7, P2912.15.8, P2912.16, P2912.16.1, P2912.16.2, P2912.16.3, P2912.16.4, SECTION P2913, P2913.1, P2913.2, P2913.3, P2913.3.1, P2913.3.1.1, P2913.3.1.2, P2913.3.1.3, P2913.4, P2913.4.1, P2913.4.2, CHAPTER 34 (New), SECTION 3401 (New), P3401.1 (New), P3401.2 (New), TABLE P3401.2(1) (New), TABLE P3401.2(3) (New), TABLE P3401.2.2(2) (New), P3401.3 (New), FIGURE P3401.3 (New), P3401.4 (New), P3401.5 (New), P3401.6 (New), P3401.7 (New), P3401.8 (New), P3401.9 (New), P3401.9.1 (New), P3401.9.2 (New), P3401.9.3 (New), P3401.9.3.1 (New), P3401.9.3.2 (New), P3401.9.4 (New), P3401.9.5 (New), TABLE P3401.9.5 (New), P3401.9.6 (New), P3401.9.7 (New), P3401.9.8 (New), P3401.9.9 (New), P3401.9.10 (New), P3401.10 (New), P3401.10.1 (New), P3401.10.2 (New), P3401.10.3 (New), P3401.11 (New), P3401.12 (New), P3401.13 (New), SECTION P3402 (New), P3402.1 (New), 3402.2 (New), P3402.3 (New), P3402.4 (New), P3402.5 (New), P3402.6 (New), P3402.7 (New), P3402.8 (New), P3402.9 (New), P3402.9.1 (New), TABLE P3402.9.1 (New), P3402.9.2 (New), P3402.10 (New), P3402.10.1 (New), P3402.10.2 (New), P3402.11 (New), P3402.12 (New), P3402.13 (New), P3402.13.1 (New), P3402.13.2 (New), P3402.13.3 (New), P3402.14 (New), P3402.14.1 (New), P3402.14.2 (New), P3402.14.3 (New), P3402.14.4 (New), P3402.14.5 (New), P3402.14.6 (New), P3402.14.7 (New), P3402.15 (New), P3402.15.1 (New), P3402.15.2 (New), P3402.15.3 (New), P3402.15.4 (New), SECTION 3403 (New), P3403.1 (New), P3403.2 (New), P3403.3 (New), P3403.4 (New), P3403.5 (New), P3403.5.1 (New), P3403.5.2 (New), P3403.6 (New), P3403.7 (New), P3403.7.1 (New), P3403.7.2 (New), P3403.7.3 (New), P3403.7.4 (New), P3403.8 (New), P3403.9 (New), P3403.10 (New), P3403.10.1 (New), TABLE P3403.10.1 (New), P3403.10.2 (New), P3403.10.3 (New), P3403.11 (New), P3403.11.1 (New), P3403.11.2 (New), P3403.12 (New), P3403.13 (New), P3403.14 (New), P3403.14.1 (New), P3403.14.2 (New), P3403.14.3 (New), P3403.15 (New), P3403.15.1 (New), P3403.15.2 (New), P3403.15.3 (New), P3403.15.4 (New), P3403.15.5 (New), P3403.15.6 (New), P3403.15.7 (New), P3403.15.8 (New), >P3403.16 (New), P3403.16.1 (New), P3403.16.2 (New), P3403.16.3 (New), P3403.16.4 (New), SECTION P3404 (New), P3404.1 (New), P3404.2 (New), P3404.3 (New), P3404.3.1 (New), P3404.3.1.1 (New), P3404.3.1.2 (New), P3404.3.1.3 (New), P3404.4 (New), P3404.4.1 (New), P3404.4.2 (New), 44 DOE, (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

SECTION R202
DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating *wastewater* and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Delete without substitution:

~~SECTION P2910~~
~~NONPOTABLE WATER SYSTEMS~~

~~**P2910.1 Scope.** The provisions of this section shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2910.2 Water quality.** Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the *jurisdiction*. Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent requirements of this code applicable to such sources.~~

~~**P2910.2.1 Residual disinfectants.** Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use. **Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.2.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter. **Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.3 Signage required.** Nonpotable water outlets such as hose connections, open-ended pipes and faucets shall be identified at the point of use for each outlet with signage that reads, "Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER. DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant, waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and in colors contrasting the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2910.3 shall appear on the signage required by this section.~~

~~**FIGURE P2910.3 PICTOGRAPH—DO NOT DRINK**~~

~~**P2910.4 Permits.** *Permits* shall be required for the construction, installation, *alteration* and *repair* of nonpotable water systems. *Construction documents*, engineering calculations, diagrams and other such data pertaining to the nonpotable water system shall be submitted with each *permit* application.~~

P2910.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P2910.6 Approved components and materials. Piping, plumbing components and materials used in collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.

P2910.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P2910.8 Freeze protection. Where sustained freezing temperatures occur, provisions shall be made to keep storage tanks and the related piping from freezing.

P2910.9 Nonpotable water storage tanks. Nonpotable water storage tanks shall comply with Sections P2910.9.1 through P2910.9.11.

P2910.9.1 Sizing. The holding capacity of the storage tank shall be sized in accordance with the anticipated demand.

P2910.9.2 Location. Storage tanks shall be installed above or below grade. Above-grade storage tanks shall be protected from direct sunlight and shall be constructed using opaque, UV-resistant materials such as, but not limited to, heavily tinted plastic, lined metal, concrete and wood; or painted to prevent algae growth; or shall have specially constructed sun barriers including, but not limited to, installation in garages, *crawl spaces* or sheds. Storage tanks and their manholes shall not be located directly under any soil piping, waste piping or any source of contamination.

P2910.9.3 Materials. Where collected on site, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The storage tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.

P2910.9.4 Foundation and supports. Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with this code.

P2910.9.4.1 Ballast. Where the soil can become saturated, an underground storage tank shall be ballasted or otherwise secured to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold-down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the storage tank weight when full, consistent with the bearing capability of adjacent soil.

P2910.9.4.2 Structural support. Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P2910.9.5 Makeup water. Where an uninterrupted nonpotable water supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by means of an *air gap* not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with Section P2902. A *full-open valve* located on the makeup water supply line to the storage tank shall be provided. Inlets to the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall be prohibited from dropping below the source water inlet or the intake of any attached pump.

P2910.9.5.1 Inlet control valve alarm. Makeup water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the storage tank begins to discharge into the overflow system.

P2910.9.6 Overflow. The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table P2910.9.6. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or *floor drain*; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by $^{1}/_{4}$-inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed to prevent freezing on roof walks. The overflow drain shall not be equipped with a shutoff valve. Not less than one cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P2910.9.6 SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	$1^{1}/_{2}$
1,501 to 3,000	2
3,001 to 5,000	$2^{1}/_{2}$
5,001 to 7,500	3
Over 7,500	4

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P2910.9.7 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade storage tanks, located outside of the *building*, shall be provided with a manhole either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. **Exception:** Storage tanks under 800 gallons (3028 L) in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.

P2910.9.8 Venting. Storage tanks shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or a U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade, or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P2910.7.

SECTION P2911
ON-SITE NONPOTABLE WATER REUSE SYSTEMS

P2910.9.9 Drain. A drain shall be located at the lowest point of the storage tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P2910.9.6. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P2910.10 Marking and signage. Each nonpotable water storage tank shall be *labeled* with its rated capacity. The contents of storage tanks shall be identified with the words, "CAUTION: NONPOTABLE WATER. DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER—CONFINED SPACE." Markings shall be indelibly printed on the tank, or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

P2910.11 Storage tank tests. Storage tanks shall be tested in accordance with the following:

1. Storage tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.
2. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and leaks do not exist.
3. Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is 2 inches (51 mm) below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.

P2910.12 System abandonment. If the *owner* of an on-site nonpotable water reuse system or rainwater collection and conveyance system elects to cease use of or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. System piping connecting to a utility-provided water system shall be removed or disabled.
2. The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable water pipe system is already in place, the fixtures shall be connected to the existing system.
3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filled with sand or equivalent.

P2910.13 Separation requirements for nonpotable water piping. Nonpotable water collection and distribution piping and reclaimed water piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5.
3. The required separation distance shall not apply where a nonpotable water pipe is located in the same trench with a *building sewer* that is constructed of materials that comply with the requirements of Table P3002.2.
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe provided that the nonpotable water pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.2.
6. The required separation distance shall not apply to irrigation piping located outside of a building and downstream of the backflow preventer where nonpotable water is used for outdoor applications.

P2910.14 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable

water shall be located in a locked vault or shall be operable only by means of a removable key.

P2911.1 General. The provisions of this section shall govern the construction, installation, *alteration* and *repair* of *on-site nonpotable water reuse systems* for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the *jurisdiction*.

P2911.2 Sources. *On-site nonpotable water reuse systems* shall collect waste discharge only from the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. Water from other *approved* nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, foundation drain water, fluid cooler discharge water and fire pump test water shall be permitted to be collected for reuse by *on-site nonpotable water reuse systems*, as *approved* by the *building official* and as appropriate for the intended application.

P2911.2.1 Prohibited sources. Reverse osmosis system reject water, water softener backwash water, *kitchen* sink wastewater, dishwasher wastewater and wastewater containing urine or fecal matter shall not be collected for reuse within an on-site nonpotable water reuse system.

P2911.3 Traps. Traps serving fixtures and devices discharging wastewater to *on-site nonpotable water reuse systems* shall comply with the Section P3201.2.

P2911.4 Collection pipe. *On-site nonpotable water reuse systems* shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the *graywater* system. Collection and vent piping materials shall comply with Section P3002.

P2911.4.1 Installation. Collection piping conveying untreated water for reuse shall be installed in accordance with Section P3005.

P2911.4.2 Joints. Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3002.

P2911.4.3 Size. Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.

P2911.4.4 Marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P2911.5 Filtration. Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P2911.6 Disinfection. Nonpotable water collected on site for reuse shall be disinfected, treated or both to provide the quality of water needed for the intended end-use application. Where the intended end-use application does not have requirements for the quality of water, disinfection and treatment of water collected on site for reuse shall not be required. Nonpotable water collected on site containing untreated *graywater* shall be retained in collection reservoirs for not more than 24 hours.

P2911.6.1 Graywater used for fixture flushing. *Graywater* used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.

P2911.7 Storage tanks. Storage tanks utilized in *on-site nonpotable water reuse systems* shall comply with Section P2910.9 and Sections P2911.7.1 through P2911.7.3.

P2911.7.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2911.7.1.

TABLE P2911.7.1 LOCATION OF NONPOTABLE WATER REUSE STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

For SI: 1 foot = 304.8 mm.

P2911.7.2 Inlets. Storage tank inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2911.7.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank, and shall not skim water from the surface.

P2911.8 Valves. Valves shall be supplied on *on-site nonpotable water reuse systems* in accordance with Sections P2911.8.1 and P2911.8.2.

P2911.8.1 Bypass valve. One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.

P2911.8.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2911.9 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2911.10 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the nonpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P2911.11 Distribution pipe. Distribution piping utilized in *on-site nonpotable water reuse systems* shall comply with Sections P2911.11.1 through P2911.11.3. **Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.

P2911.11.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.

P2911.11.2 Design. On-site nonpotable water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

Delete without substitution:

P2911.11.3 Marking. On-site nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.

P2911.12 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P2911.12.1 through P2911.12.6.

P2911.12.1 Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.

P2911.12.2 Storage tank test. Storage tanks shall be tested in accordance with Section P2910.11.

P2911.12.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P2911.12.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P2911.12.5 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.

P2911.12.6 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.

P2911.13 Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections P2911.13.1 through P2911.13.4.

P2911.13.1 Manual. A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.

P2911.13.2 Schematics. The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P2911.13.3 Maintenance procedures. The manual shall provide a schedule and procedures for system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

P2911.13.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION P2912
NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS

P2912.1 General. The provisions of this section shall govern the construction, installation, *alteration* and *repair* of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.

P2912.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted *appliances* including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.

P2912.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder

~~or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.~~

~~**P2912.4 Roof washer.** An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field-adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the *jurisdiction*. Roof washers shall be accessible for maintenance and service.~~

~~**P2912.5 Roof gutters and downspouts.** Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.~~

~~**P2912.5.1 Slope.** Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than 1/8 inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.~~

~~**P2912.5.2 Cleanouts.** Cleanouts shall be provided in the water conveyance system to allow *access to* filters, flushes, pipes and downspouts.~~

~~**P2912.6 Drainage.** Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.~~

~~**P2912.7 Collection pipe.** Rainwater collection and conveyance systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.~~

~~**P2912.7.4 Marking.** Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.~~

~~**P2912.7.2 Joints.** Collection piping conveying captured rainwater shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.~~

~~**P2912.7.3 Size.** Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~**P2912.7.1 Installation.** Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.~~

~~**P2912.8 Filtration.** Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.~~

~~**P2912.9 Disinfection.** Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.~~

~~**P2912.10 Storage tanks.** Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P2910.9 and Sections P2912.10.1 through P2912.10.3.~~

~~**P2912.10.1 Location.** Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2912.10.1.~~

TABLE P2912.10.1 LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P2912.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P2912.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P2912.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P2912.11.1 and P2912.11.2.

P2912.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P2912.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P2912.12 Pumping and control system. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P2912.13 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P2912.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P2912.14.1 through P2912.14.3. **Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.

P2912.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.

P2912.14.2 Design. Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P2912.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

P2912.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P2912.15.1 through P2912.15.8.

P2912.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P2912.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the

collection point. The gutter being tested shall not leak and shall not retain standing water.

P2912.15.2 Roofwasher test. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P2912.4 shall be verified.

P2912.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.

P2912.15.4 Storage tank test. Storage tanks shall be tested in accordance with Section P2910.11.

P2912.15.5 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P2912.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P2912.15.7 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.

P2912.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.

P2912.16 Operation and maintenance manuals. Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P2912.16.1 through P2912.16.4.

P2912.16.1 Manual. A detailed operations and maintenance manual shall be supplied in hard copy form for each system.

P2912.16.2 Schematics. The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P2912.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P2912.16.4 Operations procedures. The manual shall include system startup and shutdown procedures, and detailed operating procedures.

SECTION P2913
RECLAIMED WATER SYSTEMS

P2913.1 General. The provisions of this section shall govern the construction, installation, *alteration* and *repair* of systems supplying nonpotable reclaimed water.

P2913.2 Water pressure-reducing valve or regulator. Where the reclaimed water pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P2913.3 Reclaimed water systems. The design of the reclaimed water systems shall conform to accepted engineering practice.

P2913.3.1 Distribution pipe. Distribution piping shall comply with Sections P2913.3.1.1 through P2913.3.1.3. **Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.

~~**P2913.3.1.1 Materials, joints and connections.** Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.~~

~~**P2913.3.1.2 Design.** Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.~~

~~**P2913.3.1.3 Labeling and marking.** Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.~~

~~**P2913.4 Tests and inspections.** Tests and inspections shall be performed in accordance with Sections P2913.4.1 and P2913.4.2.~~

~~**P2913.4.1 Water supply system test.** The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.~~

~~**P2913.4.2 Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers shall be conducted in accordance with Section P2503.8.~~

Add new text as follows:

CHAPTER 34
WATER REUSE SYSTEMS

SECTION 3401
GENERAL

P3401.1 General. The provisions of this chapter shall govern the materials, design, construction, and installation of systems for the treatment, storage, and distribution of *reuse water*. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment, and distribution. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction.

P3401.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables P3401.2(1), P3401.2(2), P3401.2(3), and as established for the intended application by all applicable laws, rules, and ordinances of the jurisdiction. Where water from multiple sources is combined, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

TABLE P3401.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]	Quality Tier[b]
Direct Potable Reuse	Direct Potable Reuse	DC	4
Indirect Potable Reuse	Aquifer Recharge - Direct Injection	IC	2
	Aquifer Recharge - Surface Application	IC	2
(Treatment Follows Reuse Application)	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
	Infiltration/Percolation Lagoons	IC	2
	Raw Water Augmentation	IC	2
	Saltwater Intrusion Barrier	IC	2
	Surface Water Augmentation to a Supply Source	IC	2
-	Food crop w/ processing that destroys pathogens (Restricted Access)	LC	1
-	Orchards and Vineyards	AC/LC	4/1
-	Water contacts edible portion of food crop (Includes Root Crops)	AC	4
Irrigation of Food Crops for Human Consumption (Spray/Drip)			

	Water doesn't contact edible portion of food crop (Restricted Access)	IC	2
	Christmas Tree Farms	AC/LC	3/1
	Hemp Crops	AC/LC	3/1
Irrigation of Crops Not for Human Consumption	Fiber crops	AC/LC	3/1
	Fodder /Feed Crop/ Forage Crops	AC/LC	3/1
(Spray/Drip)	Ornamental nursery stock	AC/LC	3/1
	Silviculture / Tree Farms	AC/LC	3/1
	Sod/Turf Crops	AC/LC	3/1
	Tobacco	AC/LC	3/1
	Athletic Fields	AC/LC	3/1
Landscape Irrigation	Cemeteries	AC/LC	3/1
	College and University Campuses	AC/LC	3/1
(Spray/Drip)	Commercial Campuses	AC/LC	3/1
	Golf Courses (Restricted Access)	LC	1
	Golf Courses (Unrestricted Access)	AC/LC	3/1
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC	3/1
	Open Access Land Irrigation	AC/LC	3/1
	Pasture for Milk Producing Animals (Restricted Access)	LC	1
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC	1
	Parks	AC/LC	3/1
	Playgrounds	AC/LC	3/1
	Residential Irrigation	AC/LC	3/1
	Landscape Irrigation (Restricted Access)	LC	1
	Urban Landscaping	AC/LC	3/1
	Schoolyards	AC/LC	3/1
Water Features	Decorative Fountains	AC	3
	Landscape Impoundments (With Fountain(s))	AC	3
	Landscape Impoundments (Without Fountain(s))	LC	1
	Ponds and Lagoons	LC	1
	Recreational Impoundments (Restricted Access)	LC	1
	Recreational Impoundments (Unrestricted Access)	AC	3
	Reservoir Augmentation (Recreational)	AC	3
	Wetland Creation	LC	1
	Wetland Discharge / Application	LC	1
Life Safety	Fire Fighting Via Plane	AC	3
	Fire Hydrant Water Supply	AC	3
	Fire Protection systems	AC	3
	Non Structural Fire Fighting	AC	3
	Structural Fire Fighting	AC	3
Construction	Concrete and Cement mixing	LC	1
	Dust Control	LC	1
	Equipment Operation (Ex. Cooling Power Equipment)	LC	1
	Material Washing and Sieving	LC	1
	Soil Compaction and Consolidation	LC	1
	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
Process Water	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	3
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	1
	Cooling systems with aerosolization	AC	3
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
	Industrial Process Water (No Possibility of Human Contact)	LC	1
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	3
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	AC	3

Pressure Washing	AC	3
Priming Drainage Traps	LC	1
Road Milling	LC	1
Ship Ballasting	LC	1
Snow Making (Commercial / Recreational Use)	AC	3
Snow Making (Storage)	AC	3
Stack Scrubbing	AC	3
Stream Flow Augmentation	LC	1
Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
Vehicle and equipment Washing	AC	3
Wastewater Treatment (Process Uses)	LC	1
Window Washing	AC	3

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE P3401.2(3) LOG REDUCTION (LRV) CREDITS APPLICABLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0
Blackwater blended with ground water [a]	*LRV* credit [b] = negative log of *BWC*
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	*LRV* credit [b] = negative log of *BWC*
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

TABLE P3401.2.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimum Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances, and NSF/ANSI 350

2	Compliant with all applicable laws, rules, ordinances, and	end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and	end use fixture / equipment manufacturer requirements

P3401.3 Signage required. Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets each outlet shall be identified at the point of use with signage that reads as follows: "CAUTION: NONPOTABLE WATER – DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required text, the pictograph shown in Figure P3401.3 shall appear on the signage required by this section.

FIGURE P3401.3 PICTOGRAPH—DO NOT DRINK

P3401.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of water reuse systems. Construction documents, engineering calculations, diagrams, operation and maintenance manuals, and other such data pertaining to the water reuse system shall be submitted with each permit application.

P3401.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P3401.6 Components and materials. Piping, plumbing components, and materials used in conveyance and distribution systems shall be of material *approved* for the intended application.

P3401.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P3401.8 Freeze protection. Where freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment, and the related piping from freezing.

P3401.9 Water tanks. Water storage and process tanks shall comply with Sections P3401.9.1 through P3401.9.10.

P3401.9.1 Location. Any storage tank, process tank and equipment, or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

P3401.9.2 Materials. Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The tank shall be constructed of materials compatible with all disinfection systems used to treat water upstream of the tank and with all systems used to maintain water quality in the tank.

P3401.9.3 Foundation and supports.. All tanks shall be supported on a firm base capable of withstanding the weight of the tank when filled to capacity. Tanks shall be supported in accordance with the *International Building Code*.

P3401.9.3.1 Ballast. Where the soil can become saturated, an underground tank shall be ballasted, or otherwise secured, to resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall exceed the buoyancy force applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the tank when full, consistent with the bearing capability of adjacent soil.

P3401.9.3.2 Structural support. Where installed below grade, tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P3401.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, an additional source of makeup water shall be provided for the storage tank. All makeup water supplies shall be protected against backflow in accordance with Section P2902. A *full-open valve* located on the makeup water supply lines to the storage tank shall be provided. Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. The water level shall not be permitted to drop below the intake of any pump supplying makeup water.

P3401.9.5 Overflow. Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table P3401.9.5. The overflow pipe shall be protected from insects and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P3401.9.5 SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1 1/2
1,501 to 3,000	2
3,001 to 3,000	2 1/2
5,001 to 7,500	3
Over 7,500	4

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P3401.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade tanks, located outside of the building, shall be provided with an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). An access opening shall extend not less than 4 inches (102 mm) above ground and shall be designed to prevent water infiltration. The finished grade shall be sloped away from the maintenance hole to divert surface water. Access opening covers shall be secured to prevent unauthorized access. Service ports in an access opening shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled “CONFINED SPACE.” **Exception:** Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with an access opening provided that the tank has a service port of not less than 8 inches (203mm) in diameter.

P3401.9.7 Venting. Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P3401.7.

P3401.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P3401.9.5.Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P3401.9.9 Marking and signage. Each nonpotable water tank shall be labeled with its rated volumetric capacity. The contents of tanks shall be identified with the words “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied

P3401.9.10 Tank tests. Pressurized tanks shall be certified in accordance with Section P2609.4. Tanks that receive flow by gravity shall be tested in accordance with the following:
Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified.

P3401.10 System abandonment. If the owner of an on-site *water reuse system* or components thereof elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with Sections P3401.10.1 through P3401.10.3.

P3401.10.1 Utility-connected piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

P3401.10.2 Distribution piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

P3401.10.3 Tanks. Tank(s) shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

P3401.11 Trenching requirements for nonpotable water piping. Nonpotable water distribution piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604. **Exceptions:**

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table P3002.2.

2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5
3. Nonpotable water pipe is permitted to be located in the same trench as a *building sewer*, provided that such sewer is constructed of materials that comply with the requirements of Table P3002.1(2).
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

P3401.12 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section P3401.3.

P3401.13 Operation and Monitoring. The design, installation and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

SECTION P3402
GRAYWATER AND BLACKWATER REUSE

P3402.1 General. The provisions of ASTM E2635 and Section P3402 shall govern the construction, installation, alteration and repair of water reuse systems.

3402.2 Graywater sources. Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, laundry trays, condensate and other domestic wastewaters that are not expected to contain urine, fecal matter, grease or food wastes.

P3402.3 Blackwater sources. Blackwater shall be discharged to the sanitary drainage system in accordance with Chapter 30 or to an approved on-site blackwater reuse system.

P3402.4 Other sources. Other sources including, but not limited to, condensate, reverse osmosis system reject water and water softener discharge water shall also be considered for use in a water reuse system.

P3402.5 Traps. Traps serving fixtures and devices discharging water to water reuse systems shall comply with Section P3201.2.

P3402.6 Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P3402.7 Treatment. Water collected for reuse shall be treated to meet the quality standards required in Tables P3401.2(1) and P3401.2(2).

P3402.8 Treatment systems. Treatment systems shall be installed to allowaccess for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters or other approved methods to indicate when servicing or

replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P3402.9 Tanks. Nonpotabletanksutilized in water reuse systems shall comply with Sections P3401.9, P3402.9.1 and P3402.9.2.

P3402.9.1 Location. Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3402.9.1.

TABLE P3402.9.1 LOCATION OF NONPOTABLE WATER REUSE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

1 foot = 304.8 mm.

P3402.9.2 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the tank and shall not skim water from the surface.

P3402.10 Valves. Valves shall be installed on the collection piping of the *water reuse system*s in accordance with Sections P3402.10.1 and P3402.10.2.

P3402.10.1 Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, as applicable, to divert untreated on-site reuse sources to the sanitary sewer or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow. Bypass valves shall be provided with access that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

P3402.10.2 Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section P3008.

P3402.11 Pumping and control system. Mechanical equipment including pumps, valves, and treatment units shall have *access* in order to replace, repair, maintain and clean. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3402.12 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3402.13 Distribution piping. Distribution piping utilized in water reuse systems shall comply with Sections P3402.13.1 through P3402.13.3. **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventer.

P3402.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906.

P3402.13.2 Design. Water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3402.13.3 Labeling and marking. Nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.

P3402.14 Tests and Inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections P3402.14.1 through P3402.14.7.

P3402.14.1 Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.5.

P3402.14.2 Tank test. Tanks shall be tested in accordance with Section P3401.9.10.

P3402.14.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3402.14.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3402.14.5 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the tank and piping systems in accordance with Section P3401.7.

P3402.14.6 Initial water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with all applicable laws, rules and ordinances of the jurisdiction.

P3402.14.7 Operational water quality testing. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

P3402.15 Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site*water reuse system*s in accordance with Sections P3402.15.1 through P3402.15.4 and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

P3402.15.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P3402.15.2 Schematics. The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

P3402.15.3 Maintenance procedures. The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3402.15.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 3403
NONPOTABLE RAINWATER COLLECTION SYSTEMS

P3403.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of

nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

P3403.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.

P3403.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

P3403.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically. Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the stormwater runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.

P3403.5 Roof gutters and downspouts . Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.

P3403.5.1 Slope. Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $^1/_8$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.

P3403.5.2 Cleanouts. Cleanouts shall be provided in the water conveyance system to allow access to filters, flushes, pipes and downspout

P3403.6 Drainage. Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.

P3403.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.

P3403.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.

P3403.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.

P3403.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage-sizing requirements specified in Section P3005.4

P3403.7.4 Marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.

P3403.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P3403.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected

as needed to ensure that the required water quality is delivered at the point of use.

P3403.10 Storage tanks. Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P3401.9 and Sections P3403.10.1 through P3403.10.3.

P3403.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3403.10.1.

TABLE P3403.10.1 LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE (feet)
Critical root zone	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P3403.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P3403.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P3403.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P3403.11.1 and P3403.11.2.

P3403.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P3403.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P3403.12 Pumping and control system.. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P3403.13 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3403.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P3403.14.1 through P3403.14.3. **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventerrigation piping located outside of the building and downstream of a backflow preventer.

P3403.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirementsspecified in Section

P2906 for nonpotable water.

P3403.14.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P3403.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

P3403.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P3403.15.1 through P3403.15.8.

P3403.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P3403.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

P3403.15.2 Roofwasher test.. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P3403.4 shall be verified.

P3403.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.5.

P3403.15.4 Storage tank test . Storage tanks shall be tested in accordance with the Section P3401.9.10.

P3403.15.5 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3403.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3403.15.7 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P3401.7.

P3403.15.8 Water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

>P3403.16 Operation and maintenance manuals.. Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P3403.16.1 through P3403.16.4.

P3403.16.1 Manual.. A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.

P3403.16.2 Schematics. The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P3403.16.3 Maintenance procedures. The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3403.16.4 Operations procedures. The manual shall include system startup and shutdown procedures, and detailed operating procedures.

SECTION P3404
RECLAIMED WATER SYSTEMS

P3404.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of systems supplying nonpotable reclaimed water.

P3404.2 Water pressure-reducing valve or regulator. Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3404.3 Reclaimed water systems. The design of the reclaimed water systems shall conform to accepted engineering practice.

P3404.3.1 Distribution pipe. Distribution piping shall comply with Sections P3404.3.1.1 through P3404.3.1.3. **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventer.

P3404.3.1.1 Materials, joints and connections. . Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.

P3404.3.1.2 Design. Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3404.3.1.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P3401.3.

P3404.4 Tests and inspections.. Tests and inspections shall be performed in accordance with Sections P3404.4.1 and P3404.4.2.

P3404.4.1 Water supply system test. The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.

P3404.4.2 Inspection and testing of backflow prevention assemblies. . The testing of backflow preventers shall be conducted in accordance with Section P2503.8.

Add new standard(s) as follows:

N/A. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

More detail is needed on blackwater reuse and related quality.

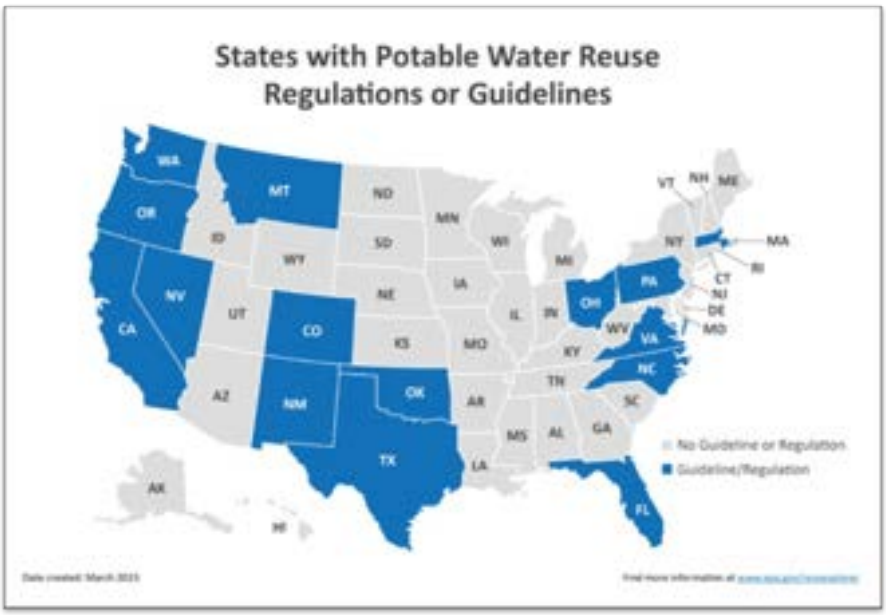
This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the

building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the practice is currently labeled "Advanced Water Purification" (AWP) instead of DPR.



Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

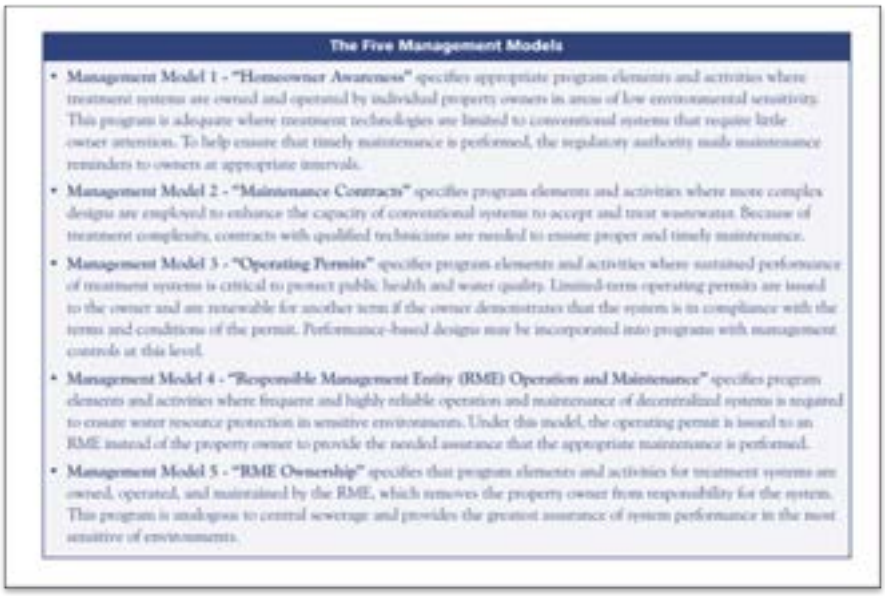
These log reductions, mean that enteric viruses are reduced by 99.9999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.9999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment

techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality,and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)



The Five Management Models

- **Management Model 1 - "Homeowner Awareness"** specifies appropriate program elements and activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity. This program is adequate where treatment technologies are limited to conventional systems that require little owner attention. To help ensure that timely maintenance is performed, the regulatory authority mails maintenance reminders to owners at appropriate intervals.
- **Management Model 2 - "Maintenance Contracts"** specifies program elements and activities where more complex designs are employed to enhance the capacity of conventional systems to accept and treat wastewater. Because of treatment complexity, contracts with qualified technicians are needed to ensure proper and timely maintenance.
- **Management Model 3 - "Operating Permits"** specifies program elements and activities where sustained performance of treatment systems is critical to protect public health and water quality. Limited-term operating permits are issued to the owner and are renewable for another term if the owner demonstrates that the system is in compliance with the terms and conditions of the permit. Performance-based designs may be incorporated into programs with management controls at this level.
- **Management Model 4 - "Responsible Management Entity (RME) Operation and Maintenance"** specifies program elements and activities where frequent and highly reliable operation and maintenance of decentralized systems is required to ensure water resource protection in sensitive environments. Under this model, the operating permit is issued to an RME instead of the property owner to provide the needed assurance that the appropriate maintenance is performed.
- **Management Model 5 - "RME Ownership"** specifies that program elements and activities for treatment systems are owned, operated, and maintained by the RME, which removes the property owner from responsibility for the system. This program is analogous to central sewerage and provides the greatest assurance of system performance in the most sensitive of environments.

SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

BWC = 10,000 / (10,000 + 70,000 + 20,000)

BWC = 0.10

LRV Credit = -log (BWC)

LRV Credit = -log (0.10)

LRV Credit = 1.0

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: Alsup, Kayla and Alsup, Kayla E., "Sustainable Water Treatment Systems: A Direct Potable Proposal" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), https://sfpuc.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects, accessed July 27, 2023.

Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141.

Ghernaout, D. , Elboughdiri, N. and Alghamdi, A. (2019) Direct Potable Reuse: The Singapore NEWater Project as a Role Model. Open Access Library Journal, 6, 1-10. doi: 10.4236/oalib.1105980.

Kehoe P. & Nokhoudian T. 2022 "Onsite Water Recycling: an Innovative Approach to Solving an Old Problem". San Francisco, CA.

Leslie, Jacques., "Where Water is Scarce, Communities Turn to Reusing Wastewater," Yale Environment 360, May 1, 2018.

National Water Research Institute. "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023.

"Onsite Water Reuse Program Guidebook (2022)", San Francisco Public Utilities Commission (SFPUC), accessed July 27, 2023.

"Potable reuse: Guidance for producing safe drinking-water." Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO.

Rich, D., Andiroglu, E., Gallo, K., & Ramanathan, S. (2023). A Review of Water Reuse Applications and Effluent Standards in Response to Water Scarcity. *Water Security*. Accepted through Peer Review July 2023.

Sharvelle, S.; Ashbolt, N.; Clerico, E.; Hultquist, R.; Leverenz, H.; and A. Olivieri. (2017). "Risk-Based Framework for the Development of Public Health Guidance for Decentralized Nonpotable Water Systems." Prepared by the National Water Research Institute for the Water Environment & Reuse Foundation. Alexandria, VA. WE&RF Project No. SIWM10C15.

Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., Wastewater engineering : treatment and reuse. (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility's rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about $50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection*

Agency (USEPA) Primary and Secondary Drinking Water Quality Standards , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P157-24 Part II

Public Hearing Results (CAH1)

Errata: This proposal includes published errata Errata: The notes were missing from the table. See the Consolidated Monograph Updates document; https://www.iccsafe.org/wp-content/uploads/2024-Group-A-Consolidated-Monograph-Updates.pdf

Committee Action: **As Modified by Committee**

Committee Modification: TABLE P3401.2(1)REQUIRED WATER QUALITY FOR REUSE APPLICATION

Use Category	Application	Exposure[a]	Quality Tier[b]
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	3
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	~~AC~~DC	~~3~~4
	Pressure Washing	AC	3

Committee Reason: For the modification: This corrects makeup water for pools to be suitable for Direct Contact Tier 4. (8-2)
For the proposal as modified: The Committee agreed with the published reason statement. (8-2)

P157-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: P3401.2

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International (kthompson@safeplumbing.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Residential Code

Revise as follows:

P3401.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables P3401.2(1), P3401.2(2), P3401.2(3), and as established for the intended application by all applicable laws, rules, and ordinances of the jurisdiction. Where water from multiple sources is combined, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources. Where an alternate non-potable water source for use in toilet flushing is installed, a potable water distribution line rough-

in, sized in accordance with Section P2903, that includes a shutoff valve located where the line originates, shall be provided at each toilet.

Reason: See CAH1 Proposal P155-24 for extended substantiation supporting the need for potable water use in smart toilets and personal hygiene devices.

This proposed change only applies to buildings that chose to plumb non-potable water indoors specifically for toilet flushing. It would require a potable water supply line to be roughed in when the non-potable water supply line is installed to address smart toilets and personal hygiene devices. Smart toilets (See Figure 1) are those which include an integrated bidet feature and personal hygiene devices (See Figure 2) are an add on or toilet seat incorporating a bidet feature.

When a residential building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation. This can be expensive after move-in but can be economically addressed during initial construction.

Personal hygiene devices and smart toilets are crucial for many Americans with medical conditions, special needs or limited mobility. An allowance in the existing code to include provisions for these products is important to ensuring public health and safety. The water quality used with smart toilets and personal hygiene devices must be free of any pathogens that could cause infection or disease and, therefore, must be treated at a minimum in accordance with regulations for potable water.

Figure 1: Smart Toilet

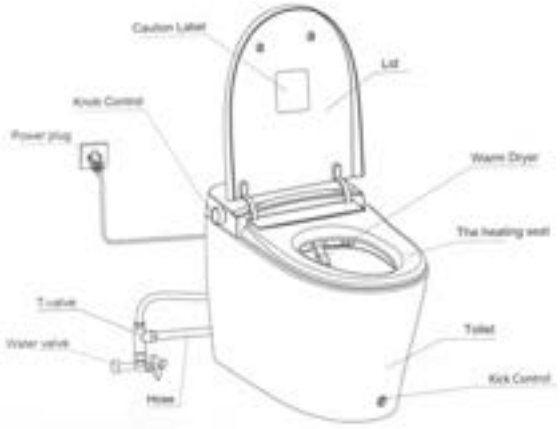


Figure 2: Personal Hygiene Device Connection

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $215 for rough in of potable water supply line.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line:

   i. Parts: 2 shutoff valves ($40 ea.), 20 ft copper pipe ($60),

   ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).

   iii. Total $215

Estimated Life Cycle Cost Impact:

Savings of $735 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

a. Re-pipe for potable water supply line after construction:

i. Construction

1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450)

ii. Plumbing

1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60),
2. Plumbing Labor: $150/hr
3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400)

iii. Permit: $100

iv. Total $950 for re-pipe after construction.

Comment (CAH2)# 647

P162-24 Part I

IPC: APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), SECTION G201 (New), G201.1 (New), SECTION 202 (New), SECTION G301 (New), G301.1 (New), G301.2 (New), G301.3 (New), G301.3.1 (New), G301.3.2 (New), G301.3.3 (New), G301.3.4 (New), G301.3.5 (New), G301.3.6 (New), G301.3.7 (New), G301.4 (New), G301.4.1 (New), G301.4.2 (New), G301.5 (New), G301.5.1 (New), G301.5.2 (New), G301.5.3 (New), G301.5.4 (New), G301.5.5 (New), G301.5.6 (New), G301.5.7 (New), G301.5.8 (New), G301.5.9 (New), G301.5.10 (New), G301.6 (New), G301.6.1 (New), G301.6.2 (New), G301.6.3 (New), G301.6.4 (New), G301.6.4.1 (New), G301.6.5 (New), TABLE G301.6.5 (New), SECTION G401 (New), G401.1 (New), TABLE G401.1 (New), G401.2 (New), G401.2.1 (New), G401.2.2 (New), G401.3 (New), TABLE G401.3 (New), G401.4 (New), SECTION G501 (New), G501.1 (New), G501.2 (New), G501.2.1 (New), G501.2.1.1 (New), G501.2.1.1.1 (New), G501.2.1.2 (New), G501.2.2 (New), G501.2.2.1 (New), 501.2.2.1.1 (New), G501.2.2.1.2 (New), G501.2.2.1.3 (New), G501.2.2.1.3.1 (New), G501.2.2.1.3.2 (New), G501.2.2.1.3.2.1 (New), G501.2.2.1.3.2.1.2 (New), G501.2.2.1.3.3 (New), G501.2.2.1.3.4 (New), G501.2.2.1.3.5 (New), G501.2.2.2 (New), G501.2.2.2.1 (New), G501.2.2.2.2 (New), G501.2.2.2.3 (New), G501.2.2.2.3.1 (New), G501.2.2.2.3.2 (New), G501.2.2.2.4 (New), G501.2.2.2.5 (New), G501.2.2.2.6 (New), G501.2.2.3 (New), G501.2.3 (New), G501.2.3.1 (New), G501.2.3.2 (New), G501.2.3.4 (New), G501.2.3.5 (New), G501.2.3.6 (New), G501.2.4 (New), G501.2.4.1 (New), G501.2.4.1.1 (New), G501.2.4.1.2 (New), G501.2.4.1.3 (New), G501.2.4.2 (New), G501.2.4.2.1 (New), G501.2.4.2.2 (New), G501.2.4.2.3 (New), G501.2.4.3 (New), G501.2.4.3.1 (New), G501.2.4.3.2 (New), G501.2.4.3.3 (New), G501.3 (New), G501.3.1 (New), G501.3.1.1 (New), G501.3.1.2 (New), G501.3.1.3 (New), G501.3.1.4 (New), G501.3.1.5 (New), G501.3.2 (New), SECTION G601 (New), G601.1 (New), TABLE G601.1 (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G
Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION G101
GENERAL

G101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

G101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

SECTION G201
DEFINITIONS

G201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

APPROVED RATING PROVIDER. An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency

ratings produced by such home water efficiency raters.

APPROVED SOFTWARE RATING TOOL. A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water consumption, annual water costs and a Water Rating Index for a home.

AUTOMATIC IRRIGATION SYSTEM. An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

BEDROOM. A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A "den," "library," "home office" with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

IRRIGATED AREA. The portion of a lot that receives supplemental water for irrigation.

LOT SIZE. The area of a single parcel of land on which the Rated Home is located.

OTHER WATER USE. Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

OUTDOOR WATER USE. Water use that occurs outside of the exterior walls of a dwelling unit.

RATED HOME. The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

REFERENCE HOME. A hypothetical home configured in accordance with the specifications set forth in Section G301.3 of this code and the basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

RESIDENTIAL IRRIGATION CAPACITY INDEX (RICI). The intensity with which an automatic irrigation system applies water calculated in accordance with Section G301.6.3.

WATER RATING INDEX (WRI). An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION G301
HOME WATER RATING CALCULATION PROCEDURE

G301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections G301.2 through G301.6. The Reference Home shall be configured in accordance with Sections G301.3 and G301.4, and the Rated Home shall be configured in accordance with Section G301.5 and G301.6 .

G301.2 Calculating the Water Rating Index. . A Water Rating Index shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$

Equation G301.2-1

G301.3 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:

refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +
refTgpd + refSofgpd + refOther

(Equation G301.3-1)

Where:

refFgpd = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

G301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows:

$refFgpd = 14.6 + 10 \times Nbr$ **(Equation G301.3.1-1)**

Where:

Nbr = number of bedrooms in the Rated Home

G301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows:

$refWgpd = 9.8 \times Nbr^{0.43}$ **(Equation G301.3.2-1)**

Where:

Nbr = number of bedrooms

G301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:

$$refDWgpd = \frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$$

(Equation G301.3.3-1)

Which simplifies to:

refWgpd = 1.97 + 0.7802 × *Nbr*

Where:

Nbr = number of bedrooms

(88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.3.4 Determining Daily Reference Home Clothes Washer Water Use. Reference Home daily clothes washer water use shall be calculated as follows:

$$refCWgpd = \frac{(3.0 \times 11.4 \times ACY)}{365}$$

(Equation G301.3.4-1)

Where:

3.0 = reference washer capacity (*CAPw*) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = (164 + 46.5 × *Nbr*)

Nbr = number of bedrooms

G301.3.5 Determining Daily Reference Home Toilet Water Use. Reference Home daily toilet water use shall be calculated as follows:

refTgpd = *refFPO* × *refGPF* × *Occ* **(Equation G301.3.5-1)**

Where:

RefFPO = the Reference Home flushes per person per day = 5.05

RefGPF = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = 1.09 + 0.54 × *Nbr*

Nbr = number of bedrooms

G301.3.6 Determining Daily Reference Home Water Softener Use. Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:

refSofgpd = $\frac{\text{grains of hardness}}{\text{gallon of water}}$ × sum of indoor water uses in the Reference Home × $\frac{5 \text{ gallons used}}{1{,}000 \text{ grains removed}}$ **(Equation G301.3.6-1)**

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0.

G301.3.7 Determining Daily Reference Home Other Water Use. Reference Home daily other water use shall be determined as follows:

refOther = 5.93 × *Nbr* **(Equation G301.3.7-1)**

Where:

Nbr = the number of bedrooms in the Rated Home

G301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation G301.4-1.

$$\left[\frac{Exp(A)}{1+Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET^{0.7154} \times Ref\_Irr\_Area^{0.6227} + 0.5756 \times ind\_Pool \times netET]$$

(Equation G301.4-1)

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use Equation G301.4-2.

[

$\left[\frac{Exp(B)}{1+Exp(B)}\right]$

× 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Ref_Irr_Area*]]+ *ref_Pool*(Equation G301.4-2)

Either equation shall be constrained as follows:

IF

Rat_Irr_Area < Ref_Irr_Area

THEN

Ref_Out = Equation G301.4-1 or G301.4-2

$$\frac{\text{Equation 1 (Using Rat\_Irr\_Area and ind\_Pool = 0)}}{\text{Equation 1 (with Ref\_Irr\_Area and ind\_Pool = 0)}}$$

AND

Outdoor Reference Home Annual Water Use shall never be lower than Equation G301.4-2

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section G301.4.1

Rat_Irr_Area = the size of the irrigated area in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation G301.4-1 (using *ind_Pool* = 1) – Equation G301.4-1 (using *ind_Pool* = 0)

G301.4.1 Determining Outdoor Daily Water Use for the Reference Home. Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.4-1 or Equation G301.4-2, as appropriate, by 1,000 and dividing the product

by 365.

G301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows:
Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

$$Ref\_Irr\_Area = Lot\_Area \times (0.002479 \times Lot\_Area^{0.6157}) \quad \text{(Equation G301.4.2-1)}$$

Where the Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

$$Ref\_Irr\_Area = Lot\_Area \times 0.577 \quad \textbf{(Equation G301.4.2-2)}$$

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

G301.5 Determining Daily Indoor Water Use of the Rated Home. The daily Indoor Water Use of the Rated Home shall be calculated as follows:

$$Indoor_{gpd} = Shower_{gpd} + KitchF_{gpd} + LavF_{gpd} + Waste_{gpd} + CW_{gpd} + DW_{gpd} + Toilets_{gpd} + Soft_{gpd} + Other + EP_{gpd} \quad \textbf{(Equation G301.5-1)}$$

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

G301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:

Showergpd = FixtureTot × showerpc × SHeff **(Equation G301.5.1-1)**

Where:*FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301, Addendum A = $\frac{adjFmix}{Fmix}$ *× refFgpd*

Shower pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate

$= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$

G301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows:

KitchFgpd = FixtureTot × faucetpc × KitchFeff × kitch **(Equation 301.5.2-1)**

Where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ *× refFgpd*

faucetpc = percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

$= \frac{\text{average flow rate of kitchen faucets in the Rated Hame}}{2.2}$

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

G301.5.3 Determining Daily Lavatory Faucet Water Use for the Rated Home. Rated Home daily lavatory faucet use shall be calculated as follows:*LavFgpd* = FixtureTot × faucetpc × LavFeff × Lav (Equation G301.5.3-1)
Where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31%

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$$\frac{adjFmix}{Fmix} \times refFgpd$$

faucet_pc = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

G301.5.4 Determining Daily Hot Water Waste for the Rated Home. Rated Home daily hot water waste shall be calculated as follows: *Wastegpd = Feff* × (*oWgpd + sWgpd* × *WDeff*) **(Equation G301.5.4-1)**

Where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.5 Determining Daily Clothes Washer Water Use for the Rated Home. Rated Home daily clothes washer water use shall be calculated as follows:

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

(Equation G301.5.5-1)

Where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)

×

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

Where:*CAPw* = the capacity of the clothes washer in ft3

(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

= best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

G301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. Rated Home daily dishwasher water use shall be calculated as follows:

DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation G301.5.6-1)**

Where:

Nbr = number of bedrooms in the Rated Home

DWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.
b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.
c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):
gal/cycle = h2o_kWh × elec_h2o

h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

Where:

$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504

gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows:
Toiletgpd = refFPO × gpf × Occ
Where:

RefFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush

volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = 1.09 + 0.54 × *Nbr*

Nbr = the number of bedrooms in the Rated Home

G301.5.8 Determining Daily Water Softener Water Use for the Rated Home. Rated Home daily water softener water use shall be calculated as follows:

Softgpd = $\frac{\text{grains of hardness}}{\text{gallon of water}}$ × [sum of softened water uses in the Rated Home] × [gallons used per 1,000 grains of hardness]

(Equation G301.5.8-1)

Where:

softened water = water conditioned by a water softener

G301.5.9 Determining Daily Other Water Use for the Rated Home. Rated Home daily other water use shall be calculated as follows:*Othergpd* = 5.93 × *Nbr* **(Equation G301.5.9-1)**

Where:

Nbr = the number of bedrooms in the rated home

G301.5.10 Determining Daily Excess Pressure Adjustment Water Use for the Rated Home. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows:*EPgpd* = MAX {[(*Showergpd* + (0.5 × (*LavFgpd* + *KitchFgpd* + *Othergpd*))) × 0.006 × (*PR* – 90)],0} **(Equation G301.5.10-1)**

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

G301.6 Determining Outdoor Water Use for the Rated Home. The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

$\left[\frac{Exp(A)}{1+Exp(A)}\right]$ × 1.18086 × [2.0341 × netET0.7154 × *Rat_Irr_Area*0.6227 + 0.5756 × *ind_Pool* × *netET*] **(Equation G301.6-1)**Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows:

[$\left[\frac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*]] + *Pool_use* **(Equation G301.6-2)**

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$\left[\frac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*] **(Equation G301.6-3)**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation G301.6-1 (using *ind_Pool* = 1) – Equation G301.6-1 (using *ind_Pool* = 0)

G301.6.1 Determining Outdoor Daily Water Use for the Rated Home. Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.6-1 or Equation G301.6-2, as appropriate, as such result may be further modified pursuant to Sections G301.6.1 through G301.6.4, by 1,000 and dividing the product by 365.

G301.6.2 Weather-based Controllers. Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation (less the water use associated with pools) by 15% in homes that have automatic irrigation system.

G301.6.3 Commissioning of an Automatic Irrigation System. In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified

by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

G301.6.4 Residential Irrigation Capacity Index (RICI). In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

$$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$$

(Equation G301.6.4-1)

G301.6.4.1 Applying RICI. A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

G301.6.5 Applying Adjustments to the Outdoor Water Use of Rated Homes. Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table G301.6.5.

TABLE G301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	G301.6.2 —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	G301.6.3 — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	CI301.6.4 —Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section G301.6.4 and adjusted in partially finished landscapes to be calculated as: $\frac{RICI_{rat}}{\text{(Predicted } Back\_irr \text{ is defined in Section G401.5.)}}$

SECTION G401
MINIMUM RATED FEATURES

G401.1 N/A MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table G401.1.

TABLE G401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer's data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer's data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer's data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

G401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections G401.2.1 and G401.2.2.

G401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

G401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.
3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

G401.3 Default Values. Values that are not available in accordance with Table G401.1 or are absent from the home at the time of the rating shall use default values in accordance with Table G401.3. Values for building elements that are not specified in Table G401.3 are required for a rating to be issued.

TABLE G401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.

Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section G301.4.

G401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section G301.6 with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:
Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = Total_available_area

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = Predicted Back_irr + Front_irr

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

SECTION G501
CERTIFICATION AND LABELING

G501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

G501.2 Rating Requirements. .

G501.2.1 General. The rating for a home shall be determined in accordance with Sections G501.2.1.1 through G501.2.1. 2 .

G501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

G501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section G401 shall be used to collect required data.

G501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section G301.

G501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections G501.2.2.1 through G501.2.2.1.3 .

G501.2.2.1 Water Cost Savings.

501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

G501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

G501.2.2.1.3 Water Cost Savings Calculations. .

G501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

G501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where

peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

G501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections G501.2.2.1.3 through G501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

G501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

G501.2.2.2 Sanitary Sewer Service Cost Saving. .

G501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

G501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

G501.2.2.2.3 Sewer Cost Savings Calculations. .

G501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

G501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. Repeat the process described in Section CI501.2.2.2.3 for the Rated Home to calculate the annual sewer volume charge of the Rated Home.

G501.2.2.2.5 Estimated Sewer Cost Savings. Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

G501.2.2.2.6 Combined Presentation of Cost Savings. Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as “water and sewer” savings.

G501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.

3. Stormwater fees.

G501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections G501.2.3.1 through G501.2.3.6

G501.2.3.1 Location. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

G501.2.3.2 Name of rater. The name of the certified rater conducting the Rating.

G501.2.3 Name of provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

G501.2.3.4 DATE. The date the Rating was conducted.

G501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

G501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: “The Home Water Rating Standard Disclosure for this home is available from the Rating Provider.” At a minimum, this statement shall also include the Rating Provider’s mailing address and phone number.

G501.2.4 Rating Types. There shall be three Rating Types in accordance with Sections G501.2.4.1 through G501.2.4.3.

G501.2.4.1 Confirmed Rating. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.1.1 through G501.2.4.1.3.

G501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section G401.

G501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2 Sampled Ratings. A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections G501.2.4.2.1 through G501.2.4.2.3.

G501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.3 Projected Ratings. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.3.1 through G501.2.4.3.3.

G501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

G501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section G401.3.

G501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: "Projected Rating Based on Plans—Field Confirmation Required."

G501.3 Innovative Design Requests. .

G501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted to an Approved IDR authority and shall include, at a minimum, the following:

G501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

G501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

G501.3.1.3 Manufacturer's specifications. Manufacturer's technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

G501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

G501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections G301.1 and G301.2.

G501.3.2 Approval. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

SECTION G601
REFERENCE STANDARD

G601.1 General. See Table G601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE G601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	

RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing
--	CEC appliance database
--	EPA Energy Star Website
--	ENERGY STAR product finder database
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).
--	EPA Water Sense specification for Tank-Type Toilets
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map
--	Mortgage Industry National Home Energy Rating Systems Standard.

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as HERS$_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed language is being recommended for inclusion into the code(s) as a voluntary appendix.

P162-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This is not a code requirement and doesn't need to be in the code. Information can be published elsewhere. (10-4)

P162-24 Part I

Individual Consideration Agenda

Comment 1:

IPC: (New), SECTION G101 (New), G101.1 (New), G101.2 (New), G101.3 (New), SECTION G201 (New), G201.1 (New), TABLE G201.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Plumbing Code

Add new text as follows:

APPENDIX G Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION G101
GENERAL

G101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating and rating the water use performance of one-and two-family dwellings.

G101.2 Scope. This appendix shall provide a uniform methodology for evaluating and rating the indoor and outdoor water use performance of one-and two-family dwellings.

G101.3 Evaluation and rating. All evaluations and rating shall be performed in accordance with the RESNET/ICC-850 or other approved rating methodology

SECTION G201
REFERENCE STANDARDS

G201.1 General. See Table G201.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE G201.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED

Reason: This comment replaces the original proposal to provide a simplified approach of directly referencing the RESNET/ICC 850 standard. The language recognizes that there may be other rating methodologies that could be approved by the code official. The term labeling was removed from the proposed language to avoid any misunderstanding with respect to the defined term "labeled".

This proposal is needed for those jurisdictions where water is a precious commodity. The design of buildings has significant impact on water use efficiency. Evaluation and rating methodologies are needed to be able to compare building designs.

The committee should note that although this proposal adds subject matter pertaining only to one- and two family dwellings (not typically within the scope of the IPC), IPC Section 101.2 Scope states the following (underlined added):

> "The provisions of this code shall apply to the erection, installation, alteration, repairs, relocation, replacement, addition to, use, or maintenance of plumbing systems within this jurisdiction. This code shall regulate nonflammable medical gas, inhalation anesthetic, vacuum piping, nonmedical oxygen systems, and sanitary and condensate vacuum collection systems. The installation of fuel gas distribution piping and equipment, fuel-gas-fired water heaters, and water heater venting systems shall be regulated by the *International Fuel Gas Code*.
>
> **Exception:** Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the *International Residential Code*."

In other words, there are some jurisdictions where the IRC Plumbing Chapters are not used for one and two family dwellings but instead, the IPC is used for all buildings, including one- and two family dwellings. Therefore, this proposed appendix will be useful in the IPC under these jurisdictional circumstances.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This appendix is intended to be nonmandatory for the model I-codes and as such, there is no cost impact to the IPC. However, where a jurisdiction wishes to adopt this appendix, there would be a cost associated with having an evaluation and rating performed for a building. As stated in the original proposal, such services cost approximately $50 to $300 per home. This estimate of cost comes from a small survey of what third party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Comment (CAH2)# 182

P162-24 Part II

IRC: APPENDIX CI (New), SECTION CI101 (New), CI101.1 (New), CI101.2 (New), CI201 (New), CI201.1 (New), SECTION 202 (New), SECTION CI301 (New), CI301.1 (New), CI301.2 (New), CI301.3 (New), CI301.3.1 (New), CI301.3.2 (New), CI301.3.3 (New), CI301.3.4 (New), CI301.3.5 (New), CI301.3.6 (New), CI301.3.7 (New), CI301.4 (New), CI301.4.1 (New), CI301.4.2 (New), CI301.5 (New), CI301.5.1 (New), CI301.5.2 (New), CI301.5.3 (New), CI301.5.4 (New), CI301.5.5 (New), CI301.5.6 (New), CI301.5.7 (New), CI301.5.8 (New), CI301.5.9 (New), CI301.5.10 (New), CI301.6 (New), CI301.6.1 (New), CI301.6.2 (New), CI301.6.3 (New), CI301.6.4 (New), CI301.6.4.1 (New), CI301.6.5 (New), TABLE CI301.6.5 (New), SECTION CI401 (New), CI401.1 (New), TABLE CI401.1 (New), CI401.2 (New), CI401.2.1 (New), CI401.2.2 (New), CI401.3 (New), TABLE CI401.3 (New), CI401.4 (New), CI501 (New), CI501.1 (New), CI501.2 (New), CI501.2.1 (New), CI501.2.1.1 (New), CI501.2.1.1.1 (New), CI501.2.1.2 (New), CI501.2.2 (New), CI501.2.2.1 (New), CI501.2.2.1.1 (New), CI501.2.2.1.2 (New), CI501.2.2.1.3 (New), CI501.2.2.1.3.1 (New), CI501.2.2.1.3.2 (New), CI501.2.2.1.3.2.1 (New), CI501.2.2.1.3.2.1.2 (New), CI501.2.2.1.3.3 (New), CI501.2.2.1.3.4 (New), CI501.2.2.1.3.5 (New), CI501.2.2.2 (New), CI501.2.2.2.1 (New), CI501.2.2.2.2 (New), CI501.2.2.2.3 (New), CI501.2.2.2.3.1 (New), CI501.2.2.2.3.2 (New), CI501.2.2.2.4 (New), CI501.2.2.2.5 (New), CI501.2.2.2.6 (New), CI501.2.2.3 (New), CI501.2.3 (New), CI501.2.3.1 (New), CI501.2.3.2 (New), CI501.2.3.4 (New), CI501.2.3.5 (New), CI501.2.3.6 (New), CI501.2.4 (New), CI501.2.4.1 (New), CI501.2.4.1.1 (New), CI501.2.4.1.2 (New), CI501.2.4.1.3 (New), CI501.2.4.2 (New), CI501.2.4.2.1 (New), CI501.2.4.2.2 (New), CI501.2.4.2.3 (New), CI501.2.4.3 (New), CI501.2.4.3.1 (New), CI501.2.4.3.2 (New), CI501.2.4.3.3 (New), CI501.3 (New), CI501.3.1 (New), CI501.3.1.1 (New), CI501.3.1.2 (New), CI501.3.1.3 (New), CI501.3.1.4 (New), CI501.3.1.5 (New), CI501.3.2 (New), CI601 (New), CI601.1 (New), TABLE CI601.1 (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Add new text as follows:

APPENDIX CI
Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION CI101
GENERAL

CI101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

CI101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

Add new definition as follows:

CI201
DEFINITIONS

Add new text as follows:

CI201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

Approved Rating Provider. An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency ratings produced by such home water efficiency raters.

Approved Software Rating Tool. A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water consumption, annual water costs and a Water Rating Index for a home.

Automatic Irrigation System. An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

Bedroom. A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A “den,” “library,” “home office” with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

Irrigated Area. The portion of a lot that receives supplemental water for irrigation.

Lot Size. The area of a single parcel of land on which the Rated Home is located.

Other Water Use. Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

Outdoor Water Use. Water use that occurs outside of the exterior walls of a dwelling unit.

Rated Home. The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

Reference Home. A hypothetical home configured in accordance with the specifications set forth in Section CI301.3of this code andthe basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

Residential Irrigation Capacity Index (RICI). The intensity with which an automatic irrigation system applies water calculated in accordance with Section **CI301.6.3.**

Water Rating Index (WRI). An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION CI301
HOME WATER RATING CALCULATION PROCEDURES

CI301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections CI301.2 through CI301.6. The Reference Home shall be configured in accordance with Sections CI301.3 and CI301.4, and the Rated Home shall be configured in accordance with Section CI301.5 and CI301.6 .

CI301.2 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$

(Equation CI301.2-1)

CI301.3 Determining the Daily Indoor Water Use for the Reference Home.. The indoor daily water use for the Reference Home shall be calculated as follows:**refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +refTgpd + refSofgpd + refOther(Equation CI301.3-1)**

where:$refF_{gpd}$ = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

CI301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows: $refFgpd = 14.6 + 10 \times Nbr$ **(Equation CI301.3.1-1)**

where:

Nbr = number of bedrooms in the Rated Home

CI301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows: $refWgpd = 9.8 \times Nbr^{0.43}$ **(Equation CI301.3.2-1)**

where:

Nbr = number of bedrooms

CI301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:*refDWgpd* =

$$\frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$$

(Equation CI301.3.3-1)

Which simplifies to:

$refWgpd = 1.97 + 0.7802 \times Nbr$

Where:

Nbr = number of bedrooms

(88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.3.4 Determining Daily Reference Home Clothes Washer Water Use. Reference Home daily clothes washer water use shall be calculated as follows:*refCWgpd* =

$$\frac{(3.0 \times 11.4 \times ACY)}{365}$$

(Equation CI301.3.4-1)

Where:

3.0 = reference washer capacity (*CAPw*) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = (164 + 46.5 × *Nbr*)

Nbr = number of bedrooms

CI301.3.5 Determining Daily Reference Home Toilet Water Use. *refTgpd= refFPO* × *refGPF* × *Occ* **(Equation CI301.3.5-1)**

where:

refFPO = the Reference Home flushes per person per day = 5.05

refGPF = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = 1.09 + 0.54 ×*Nbr*

Nbr = number of bedrooms

CI301.3.6 Determining Daily Reference Home Water Softener Use.. Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:*refSofgpd* =

$$\frac{\text{grains of hardness}}{\text{gallon of water}}$$

× sum of indoor water uses in the Reference Home ×

$$\frac{5 \text{ gallons used}}{1{,}000 \text{ grains removed}}$$

(Equation CI301.3.6-1)

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0.

CI301.3.7 Determining Daily Reference Home Other Water Use. . Reference Home daily other water use shall be determined as follows:*refOther* = 5.93 × *Nbr* **(Equation CI301.3.7-1)**

where:

Nbr = the number of bedrooms in the Rated Home

CI301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation **CI301.4-1**.

$$\left[\frac{Exp(A)}{1 + Exp(A)}\right]$$

× 1.18086 × [2.0341 × *netET*0.7154 × *Ref_Irr_Area*0.6227 + 0.5756 × *ind_Pool* × *netET]* **(Equation CI301.4-1)**

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use **Equation CI301.4-2**.

$$\left[\frac{Exp(B)}{1+Exp(B)}\right]$$

× 1.22257 × [1.4233 + 0.6311 × *netET* +

0.9376 × *Ref_Irr_Area*]]+ *ref_Pool* (Equation **CI301.4-2**)*Either equation shall be constrained as follows:*

IF

Rat_Irr_Area < *Ref_Irr_Area* ***THEN*** *Ref_Out* = Equation **CI301.4-1** or **CI301.4-2**

Equation 1 (Using Rat_Irr_Area and ind_Pool = 0)
Equation 1 (with Ref_Irr_Area and ind_Pool = 0)

(Equation **CI301.4-3**)

AND

Outdoor Reference Home Annual Water
Use shall never be lower than Equation **CI301.4-2**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section **CI301.4.1**

Rat_Irr_Area = the size of the irrigated area in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation **CI301.4-1** (using *ind_Pool* = 1) – Equation **CI301.4-1** (using *ind_Pool* = 0)

CI301.4.1 Determining Outdoor Daily Water Use for the Reference Home. . Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation **CI301.4-1** or Equation **CI301.4-2**, as appropriate, by 1,000 and dividing the product by 365.

CI301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows:
Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × (0.002479 × *Lot_Area*0.6157) **(Equation CI301.4.2-1)**
wherethe Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:
Ref_Irr_Area = *Lot_Area* × 0.577Equation **CI301.4.2-2**)

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

CI301.5 Determining Daily Indoor Water Use of the Rated Home.. The daily Indoor Water Use of the Rated Home shall be calculated as follows:*Indoorgpd = Showergpd + KitchFgpd + LavFgpd + Wastegpd + CWgpd + DWgpd + Toiletsgpd + Softgpd + Other + EPgpd* **(Equation CI301.5-1)**

where:

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

CI301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:*Showergpd = FixtureTot × showerpc × SHeff* **(Equation CI301.5.1-1)**

where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301, Addendum A =

$$\frac{adjFmix}{Fmix}$$

x *refFgpd*

Shower_pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate

$$= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$$

CI301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows: $KitchFgpd = FixtureTot \times faucetpc \times KitchFeff \times kitch$ **(Equation CI301.5.2-1)**

where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$$\frac{adjFmix}{Fmix}$$

× *refFgpdfaucetpc* = percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

average flow rate of kitchen faucets in rated home

2.2

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

CI301.5.3 Determining Daily Lavatory Faucet Water Use for the Rated Home. . Rated Home daily lavatory faucet use shall be calculated as follows: $LavFgpd = FixtureTot \times faucetpc \times LavFeff \times Lav$ **(Equation CI301.5.3-1)**

where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31% *FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$$\frac{adjFmix}{Fmix}$$

x *refFgpdfaucet_pc* = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

CI301.5.4 Determining Daily Hot Water Waste for the Rated Home. Rated Home daily hot water waste shall be calculated as follows:

$Wastegpd = Feff \times (oWgpd + sWgpd \times WDeff)$ **(Equation CI301.5.4-1)**

where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use (by volume)

oWgpd = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.5.5 Determining Daily Clothes Washer Water Use for the Rated Home. Rated Home daily clothes washer water use shall be calculated as follows:

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

(Equation CI301.5.5-1)

where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)
x

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

=
best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

Where:

CAPw = the capacity of the clothes washer in ft3(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

CI301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. . Rated Home daily dishwasher water use shall be calculated as follows:

DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation CI301.5.6-1)**

where:

Nbr = number of bedrooms in the Rated Home

dWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.

b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.

c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):gal/cycle = h2o_kWh × elec_h2o
h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

Where:

$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows:

$Toiletgpd = refFPO \times gpf \times Occ$

Where:

refFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = $1.09 + 0.54 \times Nbr$

Nbr = the number of bedrooms in the Rated Home

CI301.5.8 Determining Daily Water Softener Water Use for the Rated Home. . Rated Home daily water softener water use shall be calculated as follows:*Softgpd* =

$$\frac{\text{grains of hardness}}{\text{gallon of water}} \times [\text{sum of softened water uses in the Rated Home}] \times [\text{gallons used per 1,000 grains of hardness}]$$

(Equation CI301.5.8-1)

where:

softened water = water conditioned by a water softener

CI301.5.9 Determining Daily Other Water Use for the Rated Home. . Rated Home daily other water use shall be calculated as follows:

$Othergpd = 5.93 \times Nbr$ **(Equation CI301.5.9-1)**

where:

Where:

Nbr = the number of bedrooms in the rated home

CI301.5.10 Determining Daily Excess Pressure Adjustment Water Use for the Rated Home.. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows:

$EPgpd = MAX\{[(Showergpd + (0.5 \times (LavFgpd + KitchFgpd + Othergpd))) \times 0.006 \times (PR - 90)],0\}$ **(Equation CI301.5.10-1)**

where:

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

CI301.6 Determining Outdoor Water Use for the Rated Home. The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

$$\left[\frac{Exp(A)}{1+Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET^{0.7154} \times Rat\_Irr\_Area^{0.6227} + 0.5756 \times ind\_Pool \times netET] \quad \textbf{(Equation CI301.6-1)}$$

Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows:

$$\left[\frac{Exp(B)}{1+Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area]] + Pool\_use \quad \text{(Equation } \textbf{CI301.6-2}\text{)}$$

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$$\left[\frac{Exp(B)}{1+Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area] \quad \text{(Equation } \textbf{CI301.6-3}\text{)}$$

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation **CI301.6-1** (using *ind_Pool* = 1) – Equation **CI301.6-1** (using *ind_Pool* = 0)

CI301.6.1 Determining Outdoor Daily Water Use for the Rated Home. Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation CI301.6-1 or Equation CI301.6-2 as appropriate, as such result may be further modified pursuant to Sections CI301.6.1 through CI301.6.4 , by 1,000 and dividing the product by 365.

CI301.6.2 Weather-based Controllers. . Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation, less the water use associated

with pools, by 15% in homes that have automatic irrigation system.

CI301.6.3 Commissioning of an Automatic Irrigation System. In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

CI301.6.4 Residential Irrigation Capacity Index (RICI). In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

$$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$$

(Equation CI301.6.4-1

CI301.6.4.1 Applying RICI. . A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

CI301.6.5 Applying Adjustments to the Outdoor Water Use of Rated Homes. . Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table **CI301.6.5.**

TABLE CI301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	**CI301.6.2** —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	**CI301.6.3** — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	**CI301.6.4**—Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section **CI301.6.4** and adjusted in partially finished landscapes to be calculated as: *RICI rat* (Predicted *Back irr* is defined in Section **CI401.5**)

SECTION CI401
MINIMUM RATED FEATURES

CI401.1 MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table **CI401.1**

TABLE CI401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer's data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer's data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer's data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

CI401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections **CI401.2**.1 and **CI401.2**.2.

CI401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

CI401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.
3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

CI401.3 Default Values. Values that are not available in accordance with Table CI401.1 5.0 or are absent from the home at the time of the rating shall use default values in accordance with Table **CI401.3** . Values for building elements that are not specified in Table **CI401.3** are required for a rating to be issued.

TABLE CI401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.
Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section CI301.4

CI401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section **CI301.6** with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:

Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = Total_available_area

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = Predicted Back_irr + Front_irr

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

CI501
CERTIFICATION AND LABELING

CI501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

CI501.2 Rating Requirements. .

CI501.2.1 General. The rating for a home shall be determined in accordance with Sections CI501.2.1.1through CI501.2.1. 2.

CI501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

CI501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section CI401 shall be used to collect required data.

CI501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water

consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section CI301

CI501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections CI501.2.2.1 through CI501.2.2.1.3

CI501.2.2.1 Water Cost Savings. .

CI501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

CI501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

CI501.2.2.1.3 Water Cost Savings Calculations. .

CI501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

CI501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

CI501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections CI501.2.2.1.3 through CI501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

CI501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

CI501.2.2.2 Sanitary Sewer Service Cost Savings. .

CI501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection

and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

CI501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

CI501.2.2.2.3 Sewer Cost Savings Calculations. .

CI501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

CI501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. . Repeat the process described in Section CI501.2.2.2.3 for the Rated Home to calculate the annual sewer volume charge of the Rated Home.

CI501.2.2.2.5 Estimated Sewer Cost Savings. . Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

CI501.2.2.2.6 Combined Presentation of Cost Savings. . Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as “water and sewer” savings.

CI501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.
3. Stormwater fees.

CI501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections CI501.2.3.1 through CI501.2.3.6.

CI501.2.3.1 LOCATION. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

CI501.2.3.2 NAME OF RATER. The name of the certified rater conducting the Rating.

CI501.2.3.2 NAME OF Provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

CI501.2.3.4 DATE. The date the Rating was conducted.

CI501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

CI501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: "The Home Water Rating Standard Disclosure for this home is available from the Rating Provider." At a minimum, this statement shall also include the Rating Provider's mailing address and phone number.

CI501.2.4 Rating Types. . There shall be three Rating Types in accordance with Sections CI501.2.4.1through CI501.2.4.3.

CI501.2.4.1 Confirmed Rating. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.1.1 through CI501.2.4.1.3 .

CI501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section CI401 .

CI501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2 Sampled Ratings. . A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections CI501.2.4.2.1 through CI501.2.4.2.3.

CI501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.3 Projected Ratings. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.3.1 through CI501.2.4.3.3 .

CI501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

CI501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section CI401.3 5.2.

CI501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: "Projected Rating Based on Plans—Field Confirmation Required."

CI501.3 Innovative Design Requests. .

CI501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted

to an Approved IDR authority and shall include, at a minimum, the following:

CI501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

CI501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

CI501.3.1.3 Manufacturer's specifications. Manufacturer's technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

CI501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

CI501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections CI301.1 and CI301.2 .

CI501.3.2 Approval.. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

CI601
REFERENCE STANDARDS

CI601.1 General. See Table CI601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE CI601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	
RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing	
--	CEC appliance database	
--	EPA Energy Star Website	
--	ENERGY STAR product finder database	
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database	
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).	
--	EPA Water Sense specification for Tank-Type Toilets	
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map	
--	Mortgage Industry National Home Energy Rating Systems Standard.	

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as HERS$_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important

tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

$50 to $300 per home

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost comes from a small survey of what third party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P162-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: These calculation tools are in their infancy. This was disapproved in the IPC. (9-1)

P162-24 Part II

Individual Consideration Agenda

Comment 1:

IRC: APPENDIX CI (New), SECTION CI101 (New), CI101.1 (New), CI101.2 (New), CI101.3 (New), SECTION CI201 (New), CI201.1 (New), TABLE CI201.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Residential Code

Add new text as follows:

APPENDIX CI
Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION CI101
GENERAL

CI101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating and rating the water use performance of one-and two-family dwellings.

CI101.2 Scope. This appendix shall provide a uniform methodology for evaluating and rating the indoor and outdoor water use performance of one-and two-family dwellings.

CI101.3 Evaluation and rating. All evaluations and rating shall be performed in accordance with the RESNET/ICC-850 or other approved rating methodology

SECTION CI201
REFERENCE STANDARDS

CI201.1 General. See Table CI201.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE CI201.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	CI101.3

Reason: This comment replaces the original proposal to provide a simplified approach of directly referencing the RESNET/ICC 850 standard. The language recognizes that there may be other rating methodologies that could be approved by the code official. The term labeling was removed from the proposed language to avoid any misunderstanding with respect to the defined term "labeled".

This proposal is needed for those jurisdictions where water is a precious commodity. The design of buildings has significant impact on water use efficiency. Evaluation and rating methodologies are needed to be able to compare building designs.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This appendix is intended to be nonmandatory for the IRC and as such, there is no cost impact including this in the IRC. However, where a jurisdiction wishes to adopt this appendix, there would be a cost associated with having an evaluation and rating performed for a building. As stated in the original proposal, such

services cost approximately $50 to $300 per home. This estimate of cost comes from a small survey of what third party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Comment (CAH2)# 173

Comment 2:

IRC: APPENDIX CI (New), SECTION CI101 (New), CI101.1 (New), CI101.2 (New), SECTION CI102 (New), (New), SECTION CI103 (New), CI103.1 (New), CI103.2 (New), CI104 (New), TABLE CI104.1 (New)

Proponents: Ryan Meres, RESNET, RESNET (ryan@resnet.us) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Residential Code

Add new text as follows:

APPENDIX CI
Water Use Performance Requirements for One- and Two-Family Dwellings and Townhouses

SECTION CI101
GENERAL

CI101.1 Purpose. The provisions of this appendix establish a uniform methodology for quantifying the water use performance of new one and two-family dwellings and townhouses, for use by jurisdictions seeking to adopt incentives or requirements pertaining to the water efficiency of new homes.

CI101.2 Scope. This appendix incorporates the methodology for quantifying the efficiency of the indoor and outdoor water use performance of one- and two-family dwellings and townhouses in the as-built condition. Such evaluations shall be in accordance with this appendix and ANSI/RESNET/ICC-850.

SECTION CI102
DEFINITIONS

Add new definition as follows:

Approved Rating Provider. An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such certified raters and for the quality assurance of water efficiency ratings produced by such home water efficiency raters.

Approved Software Rating Tool. A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water consumption, annual water costs and a Water Rating Index for a home.

RATED HOME. The specific real property that is evaluated using the water use performance rating procedures specified by ANSI/RESNET/ICC-850.

REFERENCE HOME. A hypothetical home configured in accordance with the specifications set forth in Section 4.3 of ANSI/RESNET/ICC-850 and the basis of comparison for the purpose of calculating the Water Rating Index of a rated home.

WATER RATING INDEX (WRI). An integer representing the relative water use of a rated home as compared with the water use of the reference home and where an Index value of 100 represents the water use of the reference home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION CI103
WATER USE PERFORMANCE

CI103.1 Compliance. The rated home shall not exceed the maximum water rating index score of [an integer between 1 and 100 selected by the adopting jurisdiction] as calculated in accordance with ANSI/RESNET/ICC 850 using an approved software rating tool.

CI103.2 Verification. Verification of the water rating index shall be by a report provided by an approved rating provider.

Add new standard(s) as follows:

CI104
REFERENCED STANDARDS

Add new text as follows:

TABLE CI104.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	CI101.2 CI103.1

Reason: The IRC Committee disapproved of P162-24 Part II in part due to the disapproval of Part I of this proposal by the IPC Committee on the previous day. The proponent is not commenting on Part I, but will respond to points raised by both technical committees. The IPC Committee stated that the proposal was not a code requirement and thus did not need to be in the code and could be found elsewhere. The IPC Committee was correct. As originally submitted, the proposal was simply a restatement of ANSI/RESNET/ICC 850-2020. As revised by this public comment, however, the proposal now is framed as a code requirement for jurisdictions that choose to adopt an enforceable performance requirement for the water efficiency of new homes. The proposal is greatly simplified by incorporating Standard 850 by reference, rather than restating it verbatim.The IRC Committee, in addition to citing the disapproval by the IPC Committee, stated that the calculation tools for quantifying the water efficiency of new homes “are in their infancy”. In actuality, Standard 850 was first adopted in 2020, and since that time over 10,000 new homes have received a rating. In 2021, Standard 850 received approval from the Environmental Protection Agency as a WaterSense Approved Certification Methodology for the WaterSense Labeled Homes Program, Version 2.0. There are currently two approved Home Certification Organizations using Standard 850 to certify homes for the WaterSense Program. The methodology in the current standard is sound and robust, and while a draft revision of Standard 850 is now out for public comment, the primary import of the forthcoming revision will be to expand its application to multifamily dwellings, rather than to correct major flaws in the methodology.
This appendix provides the means for states and local jurisdictions to set performance-based requirements for the water efficiency of new one- and two-family dwellings and townhouses. The appendix gives the adopting entity the authority to set the required maximum water rating index score. Similar to the energy rating index compliance path option for energy efficiency, the water rating index is based on a

scale from zero to 100, where each one-point reduction on the index scale equates to a one percent reduction in annual water use. The reference home represents a score of 100 on the index scale and reflects a home built in compliance with 2006 codes and standards.

According to the World Resources Institute, 25 of 50 states are in areas of medium-high to extremely high-water stress. Putting even more pressure on already-strained water resources is that as of June 2024, 41 of the top 50 new construction markets[1] were in these areas. In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and townhouses and to serve as the basis for RESNET's residential water efficiency rating system (known as HERS$_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances, this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in an August 3, 2021 *New York Times* article[2] about Oakley, UT. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate its annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

Dozens of counties, cities, towns and water utilities are working on ordinances to create their own water efficiency requirements. This will create a patchwork of different construction requirements for builders to deal with. This appendix offers a whole-house (indoor and outdoor) performance-based approach that jurisdictions can adopt, rather than creating their own, often very prescriptive and restrictive, requirements.

[1] https://www.thebuildersdaily.com/a-majority-of-new-home-markets-are-water-stressed/?utm_source=The+Builder%27s+Daily&utm_campaign=b3a5f29e94-June+13%2C+2024+-+New+Ground&utm_medium=email&utm_term=0_-b3a5f29e94-%5BLIST_EMAIL_ID%5D

[2] https://www.nytimes.com/2021/07/20/us/utah-water-drought-climate-change.html (August 3, 2021)

Bibliography: RESNET's Water Efficiency Rating System HERS ® - https://www.resnet.us/about/hersh2o/

Cost Impact: Increase

Estimated Immediate Cost Impact:

$50 to $300 per home

Estimated Immediate Cost Impact Justification (methodology and variables):

The methodology for quantifying the water efficiency of new homes under Standard 850 has no prescriptive requirements. Thus, since the rating system is entirely performance-based, it offers a builder broad flexibility in design and material choices to achieve the Water Rating Index score that may be required by the adopting local jurisdiction. Some of these options, such as compact design of domestic hot water distribution systems, actually reduce construction costs.

The cost impact presented here for this proposal is the cost of carrying out the assessment and rating of the home by a certified rating service provider. The cost estimate is drawn from a small survey conducted by RESNET in 2023 of what third-party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

ADM1-24

IFGC: 101.2.2.1 (New), 107.1.1 (New)

Proposed Change as Submitted

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS PROPOSAL WILL BE HEARD BY THE IFGC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Fuel Gas Code

Add new text as follows:

101.2.2.1 Systems where hydrogen admixtures greater than 5-percent are supplied. Fuel gas, where hydrogen admixtures are delivered, shall meet the requirements of Chapters 3, 4, 5, and 6 for the supplier-defined hydrogen admixture limits, expressed in volume concentration of gaseous hydrogen for service up to the defined hydrogen admixture limits.

107.1.1 Fuel gases. Where hydrogen admixtures are supplied, the code official shall be provided with compositional description of the fuel gas.

Reason: Section 101.2.2.1

This is one of several revisions that address the potential for hydrogen admixtures. This language confirms that systems delivering hydrogen admixtures to end use appliances and equipment must conform with requirements already in effect for natural gas including installation locations, clearances, and other installation conditions (Chapter 3), gas piping requirements (Chapter 4), appliance and equipment chimneys and vents (Chapter 5), and appliance-specific installation requirements (Chapter 6). This section is applicable to the IRC Chapter 24 as well as the IFGC. Hydrogen admixtures above 5% have a range of >5% - <95% due to the requirements found in Chapter 7 which are exclusively for Gaseous Hydrogen Systems which are defined as having at least 95% hydrogen gas by volume and not more than 1 percent oxygen by volume.

[F] GASEOUS HYDROGEN SYSTEM.

An assembly of *piping*, devices and apparatus designed to generate, store, contain, distribute or transport a nontoxic, gaseous hydrogen containing mixture having at least 95-percent hydrogen gas by volume and not more than 1-percent oxygen by volume. Gaseous hydrogen systems consist of items such as compressed gas containers, reactors and appurtenances, including pressure regulators, pressure relief devices, manifolds, pumps, compressors and interconnecting *piping* and tubing and controls.

Section 107.1.1

Due to the introduction of Hydrogen Admixtures in Natural Gas supplies, this proposed revision provides the requirement the code official be provided with the compositional description of the fuel gas to ensure appliances and equipment and piping systems are listed for use with the correct fuel gas and admixtures for the type of fuel supplied in accordance with section 301.3 Listed and labeled.

301.3 Listed and labeled.

Appliances regulated by this code shall be *listed* and *labeled* for the application in which they are used unless otherwise *approved* in accordance with Section 105. The approval of unlisted appliances in accordance with Section 105 shall be based on *approved* engineering evaluation.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The two new sections merely define what is fuel gas as opposed to a hydrogen admixture. The sections do not require any technical change and thus there will not be any labor or material expended as a result of the inclusion of these two sections in the code.

ADM1-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 10-0 and agrees that the way the proposal is written is problematic. The consensus is that the proposal should be revisited with a modification to the proposed code language. There are still a lot of questions regarding higher limits, and there are currently no standards to support or list the code language as submitted for this proposal.

ADM1-24

Individual Consideration Agenda

Comment 1:

IFGC: 101.2.2.1, 107.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

Delete and substitute as follows:

~~**101.2.2.1 Systems where hydrogen admixtures greater than 5-percent are supplied.** Fuel gas, where hydrogen admixtures are delivered, shall meet the requirements of Chapters 3, 4, 5, and 6 for the supplier-defined hydrogen admixture limits, expressed in volume concentration of gaseous hydrogen for service up to the defined hydrogen admixture limits.~~

101.2.2.1 Hydrogen admixture gas supply. Supply systems in which hydrogen is blended into admixtures greater than 5% and not exceeding 20% hydrogen by volume.

Revise as follows:

107.1.1 ~~Fuel gases~~ Gas composition. Where hydrogen admixtures are supplied, the code official shall be provided with compositional

description of the ~~fuel~~ gas.

Reason: This As Modified proposal is submitted in concert with FG 11. The addition of hydrogen admixtures is outside the scope of the IFGC and therefore a change in scope is necessary to incorporate this new technology. This additional item in the scoping Section 102.2.1 was needed to incorporate coverage of hydrogen admixtures by definition. Admixtures are not a "fuel gas" because they are greater than 5% hydrogen but they are not "hydrogen" because they are not greater than 95% hydrogen composite make up.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The two new sections merely define what is fuel gas as opposed to a hydrogen admixture. The sections do not require any technical change and thus there will not be any labor or material expended as a result of the inclusion of these two sections in the code.

Comment (CAH2)# 328

Comment 2:

IFGC: 101.2.2.1, 107.1.1

Proponents: Ted Williams, Natural Gas Direct, LLC, Natural Gas Direct, LLC (ngdllc@outlook.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

[A] 101.2.2 Gaseous hydrogen systems. *Gaseous hydrogen systems* shall be regulated by Chapter 7.

101.2.2.1 ~~Systems where hydrogen admixtures greater than 5-percent are supplied~~ Hydrogen Admixtures. ~~Fuel gas, where hydrogen admixtures are delivered, shall meet the requirements of Chapters 3, 4, 5, and 6 for the supplier-defined hydrogen admixture limits, expressed in volume concentration of gaseous hydrogen for service up to the defined hydrogen admixture limits.~~Admixtures of natural gas blended with hydrogen exceeding 5% hydrogen by volume and not exceed 20% hydrogen by volume shall be regulated by this code.

[A] 107.1 Approval. After the prescribed tests and inspections indicate that the work complies in all respects with this code, a notice of approval shall be issued by the *code official*.

Revise as follows:

107.1.1 ~~Fuel gases~~ Hydrogen admixtures in natural gas supply systems. ~~Where hydrogen admixtures are supplied, the code official shall be provided with compositional description of the fuel gas.~~Where hydrogen admixtures are supplied, the code official shall be provided with information by the natural gas supplier on the maximum percentage hydrogen by volume that is added to the natural gas.

Reason: The current state of knowledge represented by testing and analysis supports use of hydrogen admixtures in natural gas up to and including 20% without additional appliance approval testing or revision of fuel gas distribution requirements and specifications. This state of knowledge also supports an admixture limit of 20% by volume as compatible with appliances and equipment already approved for use with natural gas without additional testing or approvals. Revision for standards for safety for natural gas appliances is currently assessing using the admixture limit of 20% hydrogen by volume as the basis for approval of new appliances and equipment designs by revising the standards for safety "table of test gases" to include a hydrogen admixture of 20% by volume in natural gas listed appliances. As research and analysis continues to address admixture thresholds for natural gas appliances, future actions on standards for safety may justify a higher threshold than the 20% hydrogen by volume for natural gas appliances, but promulgation of requirements that allow

greater than 20% by volume are not justified at this time. The requirement proposed under the newly proposed Section 101.2.2.1 for hydrogen admixture percentages accomplish this and are consistent with other North American codes and standards proposals under active technical consideration by consensus standards and code body activities.
As standards for safety for natural gas appliances and equipment move forward in approving operation on hydrogen admixtures in natural gas up to and including 20% by volume (covered in the proposed Section 101.2.2.1 requirements), authorities having jurisdiction (AHJ) over approval of natural gas systems need to have information on the upper limits of hydrogen in the natural gas supply in the jurisdiction in order to approve of installations that have appliances and equipment that are fully compatible between the natural gas supply and the upper admixture limit relevant to that local jurisdiction. Again, the current state of knowledge supports an admixture limit of 20% by volume as compatible with appliances and equipment already approved for use with natural gas without additional testing or approvals, but new approvals of natural gas appliances and equipment that are listed and labeled for hydrogen admixture limits must be in agreement with the supplied natural gases. Without information from gas suppliers on hydrogen content of natural gas, the AHJ cannot determine the compatibility of proposed appliances and equipment with potential local gas supplies and might approve of installations in which aberrant appliance function and potential safety hazards might emerge as a significant risk. For example, new natural gas appliances not approved for operation on hydrogen admixture natural gases, or for hydrogen admixtures of lower-than-supply-system limits, may present such heightened risks of safe combustion behavior, but without supply information on hydrogen admixture limits, the AHJ cannot provide reliable approvals for installation of such equipment. The requirement proposed as a new Section 107.1.1 helps implement consistent treatment of added hydrogen fractions to natural gas without imposing excessively burdensome alternatives such as documentation of full natural gas compositional descriptions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

No new technical requirements are proposed via this comment and, therefore, no change in the cost of construction would be caused.

Comment (CAH2)# 546

NOTE: G1-24 PART I DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-24 Part I

IBC: 701.1, SECTION 801, 801.1, 901.1, 1401.1, 2601.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS AN 8 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC-FIRE SAFETY CODE COMMITTEE.

PART II WILL BE HEARD BY THE IBC-EGRESS CODE COMMITTEE.

PART III WILL BE HEARD BY THE IRC PLUMBING & MECHANICAL CODE COMMITTEE.

PART V WILL BE HEARD BY THE SWIMMING POOL AND SPA CODE COMMITTEE.

PART IV AND VI WILL BE HEARD BY THE PLUMBING CODE COMMITTEE.

PART VII WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

PART VIII WILL BE HEARD BY THE FIRE CODE COMMITTEE.

SEE THE TENTATIVE HEARING SCHEDULE FOR THESE COMMITTEES.

2024 International Building Code

CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. ~~The provisions of this chapter shall govern the materials~~ Materials, systems and assemblies used for structural *fire resistance* and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a *building* and the spread of fire to or from *buildings.* Design, installation, and construction of fire and smoke protection features shall comply with this chapter.

CHAPTER 8
INTERIOR FINISHES

Revise as follows:

SECTION 801

~~SCOPE~~GENERAL

801.1 Scope. ~~The provisions of this chapter shall govern the use of materials.~~ Materials used as *interior finishes*, *trim* and *decorative materials shall comply with this chapter.*.

CHAPTER 9
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~The provisions of this chapter shall specify where~~ Where fire protection and *life safety systems* are required by this chapter, ~~and shall apply to~~ the design, installation and operation of *fire protection* and *life safety systems* shall comply with this chapter.

CHAPTER 14
EXTERIOR WALLS

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. ~~The provisions of this chapter shall establish the minimum requirements for *exterior*~~ *Exterior walls*, exterior wall assemblies, *exterior wall coverings*, *exterior wall* openings, exterior windows and doors, exterior soffits and fascias, and architectural *trim shall comply with this chapter*.

CHAPTER 26
PLASTIC

SECTION 2601
GENERAL

Revise as follows:

2601.1 Scope. ~~These provisions shall govern the materials~~Materials, design, application, construction and installation of foam plastic, *foam plastic insulation*, plastic *veneer*, interior plastic finish and *trim*, light-transmitting plastics and plastic composites, including *plastic lumber* shall comply with this chapter.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all

the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part I

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee concluded that the proposal creates consistency in the language used in the scope and brings in proper terminologies (Vote: 11-0).

G1-24 Part I

NOTE: G1-24 PART II DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-24 Part II

IBC: SECTION 1001, 1001.1, 1001.2, 1101.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Building Code

CHAPTER 10
MEANS OF EGRESS

Revise as follows:

SECTION 1001
~~ADMINISTRATION~~GENERAL

1001.1 ~~General~~Scope. *Buildings* or portions thereof shall be provided with a *means of egress* system ~~as required by~~ and shall comply with this chapter. The provisions of this chapter shall control the design, construction and arrangement of *means of egress* components required to provide an *approved means of egress* from *structures* and portions thereof.

1001.2 ~~Minimum requirements~~General. It shall be unlawful to alter a *building* or *structure* in a manner that will reduce the number of *exits* or the minimum width or required capacity of the *means of egress* to less than required by this code.

CHAPTER 11
ACCESSIBILITY

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~The provisions of this chapter shall control the design~~ Design and construction of *facilities* for accessibility for individuals with disabilities shall comply with this chapter.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part II

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee agreed that this change to the titles and scope of the first sections of the chapters would add consistency across the codes in the application of the chapters. (Vote 10-3)

G1-24 Part II

NOTE: G1-24 PART III DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-24 Part III

IRC: M1201.1, M1301.1, M1401.1 (New), M1501.1 (New), SECTION M1601, M1601.1 (New), M1701.1, M1801.1 (New), SECTION M1901, M1901.1 (New), SECTION M2001, M2001.1 (New), SECTION M2101, M2101.1 (New), CHAPTER 22, SECTION M2201, M2201.1 (New), SECTION M2301, M2301.1, P2501.1, P2601.1, SECTION P2701, P2701.1 (New), P2801.1 (New), P2901.1 (New), P3001.1, SECTION P3101, P3101.1, SECTION P3201, P3201.1 (New), P3301.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

CHAPTER 12
MECHANICAL ADMINISTRATION

SECTION M1201
GENERAL

Revise as follows:

M1201.1 Scope. The provisions of of this chapter shall establish the general administrative requirements applicable to mechanical systems and inspection requirements of this code.~~Chapters 12 through 24 shall regulate the design~~Design, installation, maintenance, *alteration* and inspection of *mechanical systems* that are permanently installed and used to control environmental conditions within *buildings*shall comply with Chapters 12 through 24 of this code. These chapters shall also regulate those *mechanical systems*, system components, *equipment* and *appliances* specifically addressed in this code.

CHAPTER 13
GENERAL MECHANICAL SYSTEM REQUIREMENTS

SECTION M1301
GENERAL

Revise as follows:

M1301.1 Scope. ~~The provisions of this chapter shall govern the installation~~ Installation of *mechanical systems* not specifically covered in other chapters applicable to *mechanical systems* shall comply with this chapter. Installations of mechanical *appliances, equipment* and systems not addressed by this code shall comply with the applicable provisions of the *International Fuel Gas Code* and the *International Mechanical Code* .

CHAPTER 14
HEATING AND COOLING EQUIPMENT AND APPLIANCES

SECTION M1401
GENERAL

Add new text as follows:

M1401.1 Scope. Heating and cooling equipment and appliances shall comply with this chapter.

CHAPTER 15
EXHAUST SYSTEMS

SECTION M1501
GENERAL

Add new text as follows:

M1501.1 Scope. Exhaust systems shall comply with this chapter.

CHAPTER 16
DUCT SYSTEMS

Add new text as follows:

M1601
GENERAL

M1601.1 Scope. Duct systems serving HVAC and exhaust shall comply with this chapter.

Revise as follows:

SECTION ~~M1601~~ M1602
DUCT CONSTRUCTION

CHAPTER 17
COMBUSTION AIR

SECTION M1701
GENERAL

Add new text as follows:

M1701.1 Scope. For other than gas fired appliances regulated by Chapter 24, combustion air systems shall comply with this chapter.

Revise as follows:

~~M1701.1~~1701.2 ~~Scope~~General requirements. Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with

the *appliance* manufacturer's installation instructions. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31. The methods of providing *combustion air* in this chapter do not apply to fireplaces, fireplace stoves and direct-vent *appliances*. The requirements for combustion and dilution air for gas-fired *appliances* shall be in accordance with Chapter 24.

CHAPTER 18
CHIMNEYS AND VENTS

SECTION M1801
GENERAL

Add new text as follows:

M1801.1 Scope. For other than gas fired appliances regulated by Chapter 24, chimneys and vents shall comply with this chapter.

CHAPTER 19
SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS

Add new text as follows:

SECTION M1901
GENERAL

M1901.1 Scope. For other things fired appliances regulated by Chapter 24, appliances, systems, and equipment identified herein shall comply with this chapter.

Revise as follows:

SECTION ~~M1901~~ M1902
RANGES AND OVENS

CHAPTER 20
BOILERS AND WATER HEATERS

Add new text as follows:

SECTION M2001
GENERAL

M2001.1 Scope. Systems that heat water shall comply with this chapter.

Revise as follows:

SECTION ~~M2001~~ M2002
BOILERS

CHAPTER 21
HYDRONIC PIPING

Add new text as follows:

SECTION M2101
GENERAL

M2101.1 Scope. Hydronic piping shall comply with this chapter.

Revise as follows:

SECTION ~~M2101~~ M2102
HYDRONIC PIPING SYSTEMS INSTALLATION

CHAPTER 22
FUEL OIL STORAGE AND~~SPECIAL~~ PIPING ~~AND STORAGE~~ SYSTEMS

Add new text as follows:

SECTION M2201
GENERAL

M2201.1 SCOPE. Fuel oil storage and piping systems shall comply with this chapter.

Revise as follows:

SECTION ~~M2201~~ M2202
OIL TANKS

CHAPTER 23
SOLAR THERMAL ENERGY SYSTEMS

Revise as follows:

SECTION M2301
~~SOLAR THERMAL ENERGY SYSTEMS~~GENERAL

M2301.1 ~~General~~Scope. ~~This section provides for the design~~Design, construction, installation, *alteration* and *repair* of *equipment* and systems using solar thermal energy to provide space heating or cooling, *hot water* heating and swimming pool heating shall comply with this code.

CHAPTER 25
PLUMBING ADMINISTRATION

SECTION P2501
GENERAL

Revise as follows:

P2501.1 Scope. The provisions of this chapter shall establish the general administrative requirements applicable to plumbing systems and inspection requirements of this code. Design, installation, maintenance, alteration and inspection of plumbing systems that are permanently installed and used to control environmental conditions within buildings shall comply with Chapters 25 through 33 of this code. These chapters shall also regulate those plumbing systems, system components, equipment and appliances specifically addressed in this code.

CHAPTER 26
GENERAL PLUMBING REQUIREMENTS

SECTION P2601
GENERAL

Revise as follows:

P2601.1 Scope. ~~The provisions of this chapter shall govern the installation of plumbing not specifically covered in other chapters applicable to plumbing systems. The installation of plumbing, *appliances, equipment* and systems not addressed by this code shall comply with the applicable provisions of the *International Plumbing Code* .~~ Installation of plumbing, not specifically covered in other chapters applicable to plumbing systems, shall comply with this chapter.

CHAPTER 27
PLUMBING FIXTURES

Add new text as follows:

SECTION P2701
GENERAL

P2701.1 Scope. Design, Installation, and materials of plumbing fixtures, faucets and fixture fittings shall comply with this chapter.

Revise as follows:

SECTION ~~P2701~~ P2702
FIXTURES, FAUCETS AND FIXTURE FITTINGS

CHAPTER 28
WATER HEATERS

SECTION P2801
GENERAL

Add new text as follows:

P2801.1 Scope. Design, Installation, and materials of water heaters and hot water storage tanks shall comply with this chapter.

CHAPTER 29
WATER SUPPLY AND DISTRIBUTION

SECTION P2901
GENERAL

Add new text as follows:

P2901.1 Scope. Design, Installation, and materials of hot and cold water supply and distribution system, for utilization in connection with human occupancy and habitation, and individual water supply systems shall comply with this chapter.

CHAPTER 30
SANITARY DRAINAGE

SECTION P3001
GENERAL

Add new text as follows:

P3001.1 Scope. Design, Installation, construction, and materials of sanitary drainage systems shall comply with this chapter.

Revise as follows:

~~**P3001.1**~~ **P3001.2 General requirements~~Scope.~~** ~~The provisions of this chapter shall govern the materials, design, construction and installation of sanitary drainage systems. Plumbing materials shall conform to the requirements of this chapter.~~ The drainage, waste and vent (DWV) system shall consist of piping for conveying wastes from plumbing fixtures, *appliances* and appurtenances, including fixture traps; above-grade drainage piping; below-grade drains within the *building*, such as a *building drain*; below- and above-grade venting systems; and piping to the public sewer or private septic system.

CHAPTER 31
VENTS

Revise as follows:

SECTION P3101
~~VENT SYSTEMS~~GENERAL

P3101.1 ~~General~~ Scope. ~~This chapter shall govern the selection and installation of piping, tubing and fittings for vent systems. This chapter shall control the minimum diameter of vent pipes, circuit vents, branch vents and *individual vents*, and the size and length of vents and various aspects of vent stacks and stack vents. Additionally, this chapter regulates vent grades and connections, height above fixtures and relief vents for stacks and fixture traps, and the venting of sumps and sewers.~~ Design, installation, construction, and materials of vent systems shall comply with this chapter.

CHAPTER 32
TRAPS

Revise as follows:

SECTION P3201
~~FIXTURE TRAPS~~ GENERAL

Add new text as follows:

P3201.1 Scope. Design, installation, construction, and materials of fixture traps shall comply with this chapter.

CHAPTER 33
STORM DRAINAGE

SECTION P3301
GENERAL

Revise as follows:

P3301.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage.~~Design, installation, construction, and materials of storm drainage systems shall comply with this chapter.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part III

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This is a needed cleanup that will provide consistency across all the codes. (10-0)

G1-24 Part III

NOTE: G1-24 PART IV DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-24 Part IV

IPSDC: CHAPTER 3, SECTION 301, 301.1, CHAPTER 4, SECTION 401, 401.1, SECTION 501, CHAPTER 5, 501.1, CHAPTER 6, SECTION 601, 601.1, CHAPTER 7, SECTION 701, 701.1, CHAPTER 8, SECTION 801, 801.1, CHAPTER 9, SECTION 901, 901.1, CHAPTER 10, SECTION 1001, 1001.1, CHAPTER 11, SECTION 1101, 1101.1, CHAPTER 12, SECTION 1201, 1201.1, CHAPTER 13, SECTION 1301, 1301.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Private Sewage Disposal Code

CHAPTER 3
GENERAL REGULATIONS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the general regulations of *private*~~*Private sewage disposal systems*, including specific limitations and *flood hazard areas* shall comply with this chapter.

CHAPTER 4
SITE EVALUATION AND REQUIREMENTS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. ~~The provisions of this chapter shall govern the evaluation~~ Evaluation of private sewage disposal systems and requirements for ~~*private sewage disposal system*~~ sitesshall comply with this chapter.

SECTION 501
GENERAL

CHAPTER 5
MATERIALS

Revise as follows:

501.1 Scope. ~~The provisions of this chapter shall govern the requirements for materials~~ Materials for *private sewage disposal systems* shall comply with this chapter.

CHAPTER 6
SOIL ABSORPTION SYSTEMS

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~The provisions of this chapter shall govern the sizing~~ Sizing and installation of soil absorption systems shall comply with this chapter.

CHAPTER 7
PRESSURE DISTRIBUTION SYSTEMS

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. ~~The provisions of this chapter shall govern the design~~ Design, and installation of *pressure distribution systems* shall comply with this chapter.

CHAPTER 8
TANKS

SECTION 801
GENERAL

Revise as follows:

801.1 Scope. ~~The provisions of this chapter shall govern the design~~ Design, installation, repair and maintenance of septic tanks, treatment tanks and holding tanks shall comply with this chapter.

CHAPTER 9
MOUND SYSTEMS

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~The provisions of this chapter shall govern the design~~ Design and installation of mound systems shall comply with this

chapter.

CHAPTER 10
CESSPOOLS

SECTION 1001
GENERAL

Revise as follows:

1001.1 Scope. ~~The provisions of this chapter shall govern the design~~ Design and installation of *cesspools* shall comply with this chapter.

CHAPTER 11
RESIDENTIAL WASTEWATER SYSTEMS

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~The provisions of this chapter shall govern residential~~ Residential wastewater systemsshall comply with this chapter.

CHAPTER 12
INSPECTIONS

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope. ~~The provisions of this chapter shall govern the inspection~~ Inspection of *private sewage disposal systems* shall comply with this chapter.

CHAPTER 13
NONLIQUID SATURATED TREATMENT SYSTEMS

SECTION 1301
GENERAL

Revise as follows:

1301.1 Scope. ~~The provisions of this chapter shall govern nonliquid~~ Nonliquid saturated treament systems shall comply with this chapter.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The

Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part IV

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The Committee agreed with the published reason statement. (14-0)

G1-24 Part IV

NOTE: G1-24 PART V DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G1-24 Part V

ISPSC: 301.1, 301.1.1, 401.1, 401.2, 401.3, 501.1, 501.2, 601.1, 601.2, 601.3, 701.1, 701.1.1, 701.2, 801.1, 801.2, 901.1, 901.2, 1001.1, 1001.2

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

CHAPTER 3
GENERAL COMPLIANCE

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the general~~ General design and construction of public and *residential* pools and spas and related piping, equipment, and materials shall comply with this chapter. ~~Provisions that are unique to a specific type of pool or spa are located in Chapters 4 through 10.~~

~~**301.1.1 Application of Chapters 4 through 10.** Where differences occur between the provisions of this chapter and the provisions of Chapters 4 through 10, the provisions of Chapters 4 through 10 shall apply.~~

CHAPTER 4
PUBLIC SWIMMING POOLS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. ~~The provisions of this chapter shall apply only to~~ Design, construction, installation, repair, and operation of Class A, Class B, Class C, Class E and Class F public swimming pools shall comply with this chapter.

~~**401.2 Intent.** The provisions in this chapter shall govern the design, equipment, operation, warning signs, installation, sanitation, new construction, and *alteration* specific to the types of public swimming pools indicated in Section 401.1.~~

~~**401.3 Chapter 3 compliance required.** In addition to the requirements of this chapter, public swimming pools shall comply with the requirements of Chapter 3.~~

CHAPTER 5
PUBLIC SPAS AND PUBLIC EXERCISE SPAS

SECTION 501
GENERAL

Revise as follows:

501.1 Scope. ~~This chapter shall govern the design~~Design, installation, construction and repair of public spas and exercise spas shall comply with this chapter ~~regardless of whether a fee is charged for use~~.

~~**501.2 General.** In addition to the requirements of this chapter, public spas and public exercise spas shall comply with the requirements of Chapter 3.~~

CHAPTER 6
AQUATIC RECREATION FACILITIES

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~This chapter covers public pools and water containment systems used for aquatic recreation. This chapter provides specifications for the design~~ Design, construction, installation, alteration, repair, and operation of Class D-1 through Class D-6 ~~equipment, operation, signs, installation, sanitation, new construction, and rehabilitation of~~ public swimming pools and water containment systems intended to be used for aquatic recreation facilities shall comply with this chapter ~~play. This chapter covers Class D-1 through Class D-6 public pools whether they are provided as stand-alone attractions or in various combinations in a composite attraction.~~

601.2 Combinations. Where combinations of Class D-1 through Class D-6 pools exist within an aquatic recreation ~~a~~ facility, each element ~~in the facility~~ shall comply with the applicable code sections as if the element functioned as a part of a freestanding public swimming pool of Class D-1 through Class D-6.

~~**601.3 General.** In addition to the requirements of this chapter, aquatic recreation facilities shall comply with the requirements of Chapter 3.~~

CHAPTER 7
ONGROUND STORABLE RESIDENTIAL SWIMMING POOLS

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. ~~This chapter describes certain criteria for the design,~~ Design, manufacturing, and testing of *onground storable pools* intended for *residential* use shall comply with this chapter. ~~This includes portable pools with flexible or nonrigid side walls that achieve their structural integrity by means of uniform shape, support frame or a combination thereof, and that can be disassembled for storage or relocation. This chapter includes what has been commonly referred to in past standards or codes as onground or above-ground pools.~~

~~**701.1.1 Permanent inground residential swimming pool.** This chapter does not apply to permanent inground *residential* pools, as defined in Chapter 8.~~

~~**701.2 General.** In addition to the requirements of this chapter, onground storable *residential* swimming pools shall comply with the requirements of Chapter 3.~~

CHAPTER 8
PERMANENT INGROUND RESIDENTIAL SWIMMING POOLS

SECTION 801
GENERAL

Revise as follows:

801.1 Scope. ~~The provisions of this chapter shall govern permanent inground *residential* swimming pools. Permanent inground~~ Design, construction, installation, alteration, repair and operation of permament *residential* swimming pools ~~shall~~ which include pools that are inground, partially aboveground or entirely aboveground shall comply with this chapter ~~grade. This chapter does not cover pools that are specifically manufactured for above-ground use and that are capable of being disassembled and stored. This chapter covers new construction, modification and repair of inground *residential* swimming pools.~~

~~**801.2 General.** Permanent inground *residential* pools shall comply with the requirements of Chapter 3.~~

CHAPTER 9
PERMANENT RESIDENTIAL SPAS AND PERMANENT RESIDENTIAL EXERCISE SPAS

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~This chapter shall govern the design, installation,~~ Design, construction, installation, alteration, repair, and operation ~~and repair~~ of permanently installed *residential* spas and exercise spas intended for *residential* use, shall comply with this chapter and Sections 501 through 503 and 505 through 507..

~~**901.2 General.** Permanent *residential* spas and permanent *residential* exercise spas shall comply with Chapter 5 except that Sections 504.1, 504.1.1 and 508.1 shall not apply. Such spas shall comply with the requirements of Chapter 3.~~

CHAPTER 10
PORTABLE RESIDENTIAL SPAS AND PORTABLE RESIDENTIAL EXERCISE SPAS

SECTION 1001
GENERAL

Revise as follows:

1001.1 Scope. ~~This chapter shall govern the installation,~~ Installation, *alteration* and repair of portable *residential* spas and portable exercise spas intended for *residential* use shall comply with this chapter.

~~**1001.2 General.** In addition to the requirements of this chapter, portable *residential* spas and portable *residential* exercise spas shall comply with the requirements of Chapter 3.~~

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part V

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The proposal will provide for consistency across all the I-codes and will simplify use of the codes. (11-0)

G1-24 Part V

G1-24 Part VI

IPC: 301.1, 401.1, 501.1, 601.1, 701.1, 801.1, 901.1, 1001.1, 1101.1, 1201.1, , 1201.2(New), 1301.1, 1301.1.1(New), 1401.1; IBC: [P] 2901.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

CHAPTER 3
GENERAL REGULATIONS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the general regulations regarding the installation of plumbing not specific to other chapters.~~ General installation of plumbing systems shall comply with this chapter.

CHAPTER 4
FIXTURES, FAUCETS AND FIXTURE FITTINGS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. ~~This chapter shall govern the materials, design and installation of plumbing fixtures, faucets and fixture fittings in accordance with the type of *occupancy*, and shall provide for the minimum number of fixtures for various types of *occupancies*.~~ Design, installation, and materials of plumbing fixtures, faucets and fixture fittings shall comply with this chapter.

CHAPTER 5
WATER HEATERS

SECTION 501
GENERAL

Revise as follows:

501.1 Scope. ~~The provisions of this chapter shall govern the materials, design and installation of water heaters and the related safety devices and appurtenances.~~Design, installation, and materials of hot water heaters and hot water storage tanks shall comply with this chapter.

CHAPTER 6
WATER SUPPLY AND DISTRIBUTION

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~This chapter shall govern the materials, design and installation~~Design, installation, and materials of hot and cold ~~of~~ water supply systems~~, both hot and cold,~~ for utilization in connection with human occupancy and habitation and ~~shall govern the installation~~ of individual water supply systems shall comply with this chapter.

CHAPTER 7
SANITARY DRAINAGE

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation of sanitary drainage systems.~~ Design, Installation, construction, and materials of sanitary drainage systems shall comply with this chapter.

CHAPTER 8
INDIRECT/SPECIAL WASTE

SECTION 801
GENERAL

Revise as follows:

801.1 Scope. ~~This chapter shall govern matters concerning indirect waste piping~~ Indirect and special wastes systems shall comply with this chapter. ~~This chapter shall further control matters concerning food-handling establishments, sterilizers, humidifiers, clear-water waste, swimming pools, methods of providing *air breaks* or *air gaps*, and neutralizing devices for corrosive wastes.~~

CHAPTER 9
VENTS

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation of vent systems.~~Design, installation, construction, and materials of vent systems shall comply with this chapter.

CHAPTER 10
TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1001
GENERAL

Revise as follows:

1001.1 Scope. ~~This chapter shall govern the material and installation of traps, interceptors and separators.~~Installation and materials of traps, interceptors, and separators shall comply with this chapter.

CHAPTER 11
STORM DRAINAGE

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation of storm drainage.~~Design, installation, construction, and materials of storm drainage systems shall comply with this chapter.

CHAPTER 12
SPECIAL PIPING AND STORAGE SYSTEMS

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope. ~~The provisions of this chapter shall govern the design~~ Design and installation of piping and storage systems for nonflammable medical gas systems and nonmedical oxygen systems shall comply with this chapter.
~~All maintenance and operations of such systems shall be in accordance with the *International Fire Code.*~~

Add new text as follows:

1201.2 Maintenance and operation. Maintenance and operations of of nonflammable medical gas systems and nonmedical oxygen systems shall be in accordance with the *International Fire Code*.

CHAPTER 13
NONPOTABLE WATER SYSTEMS

SECTION 1301
GENERAL

Revise as follows:

1301.1 General. ~~The provisions of Chapter 13 shall govern the materials, design, construction and installation~~ Design, installation, construction, and materials of systems for the collection, storage, treatment and distribution of nonpotable water shall comply with this chapter. ~~For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water~~. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

Add new text as follows:

1301.1.1 Nonpotable Rainwater Systems. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the design, installation, construction, and materials of systems for rainwater collection, storage, treatment, and distribution of nonpotable water.

CHAPTER 14
SUBSURFACE GRAYWATER SOIL ABSORPTION SYSTEMS

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. ~~The provisions of this chapter shall govern the materials, design, construction and installation~~Design, installation, construction, and materials of subsurface graywater soil absorption systems connected to nonpotable water from on-site water reuse systems shall comply with this chapter.

2024 International Building Code

CHAPTER 29
PLUMBING SYSTEMS

SECTION 2901
GENERAL

Revise as follows:

[P] 2901.1 Scope. ~~The provisions of this chapter and the *International Plumbing Code* shall govern the design,~~ Design, construction, erection and installation of plumbing components, appliances, equipment and systems used in *buildings* and *structures* covered by this code shall comply with this chapter and the *International Plumbing Code*. Toilet and bathing rooms shall be constructed in accordance with Section 1210. Private sewage disposal systems shall conform to the *International Private Sewage Disposal Code* . The *International Fire Code* , the *International Property Maintenance Code* and the *International Plumbing Code* shall govern the use and maintenance of plumbing components, appliances, equipment and systems. The *International Existing Building Code* and the *International Plumbing Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of plumbing components, *appliances*, *equipment* and systems.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group

reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part VI

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This is good work to cleanup and coordinate all of the codes. (14-0)

G1-24 Part VI

Individual Consideration Agenda

Comment 1:

IPC: 501.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing,

Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Plumbing Code

501.1 Scope. Design, installation, and materials of ~~hot~~ water heaters and hot water storage tanks shall comply with this chapter.

Reason: During the hearings in Orlando, it was pointed out by a committee member the word "hot" should be removed before the words water heater in section 501.1. This Committee comment removes the term as requested by the committee member.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This committee comment is editorial and has no cost impact on construction.

Comment (CAH2)# 91

Comment 2:

IBC: CHAPTER 29, SECTION 2901, [P] 2901.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

CHAPTER 29
PLUMBING SYSTEMS

SECTION 2901
GENERAL

[P] 2901.1 Scope. Design, installation and construction of plumbing equipment and systems shall comply with this chapter, the International Plumbing Code, and the International Private Sewage Disposal Code. ~~The provisions of this chapter and the *International Plumbing Code* shall govern the design, construction, erection and installation of plumbing components, appliances, equipment and systems used in *buildings* and *structures* covered by this code. Toilet and bathing rooms shall be constructed in accordance with Section 1210. Private sewage disposal systems shall conform to the *International Private Sewage Disposal Code* . The *International Fire Code* , the *International Property Maintenance Code* and the *International Plumbing Code* shall govern the use and maintenance of plumbing components, appliances, equipment and systems. The *International Existing Building Code* and the *International Plumbing Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of plumbing components, *appliances*, *equipment* and systems.~~

Reason: The Scoping work group has continued work on IBC for Group B. In order to correlate the scoping of Chapter 29, the work group is submitting this committee comment to address the need to revise the Chapter 29 scoping to match that of the other IBC chapters and the other I-codes as well. The committee will notice that the references pertaining to maintenance, repairs, alterations and the references to the other codes have been deleted, as pointed out are not covered under the scope of this chapter of the IBC and therefore should not be included. This is an editorial change in nature and does not make any technical changes to the IBC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the reason statement, this is an editorial change that has no economic impact on the cost of construction.

Comment (CAH2)# 427

G1-24 Part VII

IMC: 301.1, 401.1, CHAPTER 5, 501.1, CHAPTER 6, 601.1, 701.1, 701.2, 702.1(New), 702.2(New), 702.3(New), 901.1, 901.2, 1001.1, 1001.2(New), 1101.1, 1201.1, 1201.2(New), 1301.1, 1301.2, 1401.1; IBC: [M] 2801.1

Proposed Change as Submitted

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes); Robert Marshall, FCAC, FCAC (fcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

CHAPTER 3
GENERAL REGULATIONS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~This chapter shall govern the approval and installation~~Installation of all *equipment* and *appliances* that comprise parts of the *building* mechanical systems shall comply with this chapter. ~~regulated by this code in accordance with Section 101.2.~~

CHAPTER 4
VENTILATION

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. ~~This chapter shall govern the ventilation~~ Ventilation of spaces within a *building* intended to be occupied, other than by systems regulated by Chapter 5, shall comply with this chapter. ~~Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems and other systems specified in Section 502 shall comply with Chapter 5.~~

CHAPTER 5
EXHAUST SYSTEMS, SMOKE CONTROL SYSTEMS, AND ENERGY RECOVERY VENTILATION SYSTEMS

SECTION 501
GENERAL

Revise as follows:

501.1 Scope. ~~This chapter shall govern the design~~Design, construction and installation of ~~mechanical~~ exhaust systems, smoke control systems, and ~~including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and~~

~~refuse conveyor systems; subslab soil exhaust systems; smoke control systems;~~ energy recovery ventilation systems shall comply with this chapter. ~~and other systems specified in Section 502.~~

CHAPTER 6
~~DUCT SYSTEMS~~AIR MOVEMENT

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~Duct systems used for the~~ Air movement for the purpose of ~~air in~~ air-conditioning, heating, ~~ventilating~~ and ventilation or exhaust systems ~~shall conform to the provisions of this chapter except as otherwise~~ other than specified in Chapters 5 and 7, shall comply with this chapter.

Exception: Ducts discharging combustible material directly into any *combustion* chamber shall conform to the requirements of NFPA 82.

CHAPTER 7
COMBUSTION AIR

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. For other than fireplaces, fireplace stoves and direct-vent *appliances*, combustion air shall comply with this chapter.
~~Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions.~~
~~Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31. The methods of providing *combustion air* in this chapter do not apply to fireplaces, fireplace stoves and direct-vent *appliances*.~~
~~The requirements for combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code*.~~

Add new text as follows:

702.1 Solid fuel-burning appliances. Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions.

702.2 Oil-fired appliances. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31.

702.3 Gas-fired appliances. Combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code.*

Revise as follows:

~~**701.2**~~**703.1 ~~Dampered openings~~Interlock.** Where *combustion air* openings are provided with volume, smoke or fire dampers, the dampers shall be interlocked with the firing cycle of the *appliances* served, so as to prevent operation of any *appliance* that draws *combustion air* from the room or space when any of the dampers are closed. Manual dampers shall not be installed in *combustion air* ducts. Ducts not provided with dampers and that pass through rated construction shall be enclosed in a shaft in accordance with the

International Building Code.

CHAPTER 9
SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~This chapter shall govern the approval,~~ For other than gas-fired *appliances* regulated by the *International Fuel Gas Code*, the design, installation, construction, maintenance, *alteration* and repair of ~~the~~ *appliances*, systems, and *equipment* specifically identified herein shall comply with this chapter.~~and factory built fireplaces. The approval, design, installation, construction, maintenance, *alteration* and repair of gas fired *appliances* shall be regulated by the *International Fuel Gas Code*.~~

Delete without substitution:

~~**901.2 General.** The requirements of this chapter shall apply to the mechanical *equipment* and *appliances* regulated by this chapter, in addition to the other requirements of this code.~~

CHAPTER 10
BOILERS, WATER HEATERS AND PRESSURE VESSELS

SECTION 1001
GENERAL

Revise as follows:

1001.1 Scope. ~~This chapter shall govern the installation~~Installation, *alteration* and repair of boilers, water heaters and pressure vessels, other than those specified in section 1001.2, shall comply with this chapter.

~~**Exceptions:**~~

1. ~~Pressure vessels used for unheated water supply.~~
2. ~~Portable unfired pressure vessels and Interstate Commerce Commission containers.~~
3. ~~Containers for bulk oxygen and medical gas.~~
4. ~~Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.~~
5. ~~Pressure vessels used in *refrigeration systems* that are regulated by Chapter 11 of this code.~~
6. ~~Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.~~
7. ~~Any boiler or pressure vessel subject to inspection by federal or state inspectors.~~
8. ~~Pressure vessels used in specific *appliances* and *equipment* that are regulated by Chapter 9 of this code.~~

Add new text as follows:

1001.2 Nonapplicability. This chapter shall not apply to the following:

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in *refrigeration systems* that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.
8. Pressure vessels used in specific *appliances* and *equipment* that are regulated by Chapter 9 of this code.

CHAPTER 11
REFRIGERATION

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~This chapter shall govern the design~~Design, installation, construction and repair of *refrigeration systems* shall comply with this chapter. ~~Permanently installed refrigerant storage systems and other components shall be considered as part of the *refrigeration system* to which they are attached.~~

CHAPTER 12
HYDRONIC PIPING

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope. ~~The provisions of this chapter shall govern the construction~~Construction, installation, *alteration* and repair of hydronic piping systems that are part of the heating, ventilation, and air-conditioning systems shall comply with this chapter. ~~This chapter shall apply to hydronic piping systems that are part of heating, ventilation and air-conditioning systems. Such piping systems shall include steam, hot water, radiant heating, radiant cooling , chilled water, steam condensate, ground source heat pump loop systems, and snow- and ice-melting. Potable cold and hot water distribution systems shall be installed in accordance with the *International Plumbing Code*.~~

Add new text as follows:

1201.2 System configuration. Hydronic piping systems shall include steam, hot water, radiant heating, radiant cooling , chilled water, steam condensate, ground source heat pump loop systems, and snow- and ice-melting. Potable cold and hot water distribution systems shall be installed in accordance with the *International Plumbing Code*.

CHAPTER 13

FUEL OIL PIPING AND STORAGE

SECTION 1301
GENERAL

Revise as follows:

1301.1 Scope. ~~This chapter shall govern the design~~Design, installation, construction and repair of fuel oil storage and piping systems shall comply with this chapter. ~~The storage of fuel oil and flammable and combustible liquids shall be in accordance with Chapters 6 and 57 of the International Fire Code.~~

1301.2 Storage ~~and piping systems~~. Fuel oil storage systems shall comply with Section 605.4 of the International Fire Code. ~~Fuel oil piping systems shall comply with the requirements of this code.~~ The storage of fuel oil and flammable and combustible liquids shall be in accordance with Chapter 57 of the *International Fire Code*.

CHAPTER 14
SOLAR THERMAL SYSTEMS

SECTION 1401
GENERAL

Revise as follows:

1401.1 Scope. ~~This chapter shall govern the design, construction,~~ Design, installation, construction *alteration* and repair of solar thermal systems, *equipment* and *appliances* intended to utilize solar energy for space heating or cooling, domestic hot water heating, swimming pool heating or process heating shall comply with this chapter.

2024 International Building Code

CHAPTER 28
MECHANICAL SYSTEMS

SECTION 2801
GENERAL

Revise as follows:

[M] 2801.1 Scope. ~~The provisions of this chapter, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the design,~~Design, construction, erection and installation of mechanical appliances, equipment and systems used in *buildings* and *structures* covered by this code shall comply with this chapter, the *International Mechanical Code* and the *International Fuel Gas Code*. Masonry chimneys, fireplaces and barbecues shall comply with the *International Mechanical Code* and Chapter 21 of this code. The *International Fire Code* , the *International Property Maintenance Code* , the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the use and maintenance of mechanical components, appliances, equipment and systems. The *International Existing Building Code* , the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of mechanical components, appliances, equipment and systems.

Reason:

Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in our reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part VII

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: According to the proponent's justification, the committee voted 14-0 to approve the proposal as submitted. The proposal's proponent argues that scoping language should be added per the chapter's content. Where the existing scoping sections covered the chapter's content, the information was reorganized into a list form to standardize the language used in the scope for all I-Codes for those chapters that lacked one. This action will clarify the chapter's contents and eliminate superfluous administrative language from the existing scoping sections.

G1-24 Part VII

Individual Consideration Agenda

Comment 1:

IBC: CHAPTER 28, SECTION 2801, [M] 2801.1; IMC®: CHAPTER 7, SECTION 701, 701.1, SECTION 702 (New), 702.1, 702.2, 702.3, SECTION 703 (New), 703.1, CHAPTER 8, 801.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, Self (sorlowski@sbcc.codes) requests As Modified by Committee (AMC2)

Further modify as follows:

2024 International Building Code

CHAPTER 28
MECHANICAL SYSTEMS

SECTION 2801
GENERAL

[M] 2801.1 Scope. ~~The provisions of this chapter, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the design, construction, erection and installation of mechanical appliances,~~ Design, Installation, and construction of mechanical equipment and systems ~~used in *buildings* and *structures* covered by this code. Masonry chimneys, fireplaces and barbecues~~ shall comply with the *International Mechanical Code* ~~and Chapter 21 of this code. The~~, the *International Fire Code* ~~, the *International Property Maintenance Code* , the *International Mechanical Code*~~ and the *International Fuel Gas Code* ~~shall govern the use and maintenance of mechanical components, appliances, equipment and systems. The *International Existing Building Code* , the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the *alteration*, *repair*, relocation, replacement and addition of mechanical components, appliances, equipment and systems~~.

2024 International Mechanical Code

CHAPTER 7
COMBUSTION AIR

SECTION 701
GENERAL

701.1 Scope. For other than fireplaces, fireplace stoves and direct-vent *appliances,* combustion air shall comply with this chapter.

Add new text as follows:

SECTION 702
FUEL-BURNING APPLIANCES

702.1 Solid fuel-burning appliances. Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the *appliance* manufacturer's installation instructions.

702.2 Oil-fired appliances. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31.

702.3 Gas-fired appliances. Combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code*.

Add new text as follows:

SECTION 703
DAMPERS

703.1 ~~Interlock~~ Damper openings. Where *combustion air* openings are provided with volume, smoke or fire dampers, the dampers shall be interlocked with the firing cycle of the *appliances* served, so as to prevent operation of any *appliance* that draws *combustion air* from the room or space when any of the dampers are closed. Manual dampers shall not be installed in *combustion air* ducts. Ducts not provided with dampers and that pass through rated construction shall be enclosed in a shaft in accordance with the *International Building Code*.

CHAPTER 8
CHIMNEYS AND VENTS

801.1 Scope. ~~This chapter shall govern the installation~~ Installation, maintenance, and repair ~~and approval~~ of ~~factory-built~~ *chimneys*~~,~~ ~~*chimney* liners,~~ and vents ~~and connectors. This chapter shall govern the utilization of masonry *chimneys*~~ shall comply with this chapter. Gas-fired *appliances* shall be vented in accordance with the *International Fuel Gas Code*.

Reason: The Scoping work group has continued work on IBC for Group B. In order to correlate the scoping of Chapter 28, the work group is submitting this committee comment to address the need to revise the Chapter 28 scoping to match that of the other IBC chapters and the other I-codes as well. The committee will notice that the references pertaining to maintenance, repairs, alterations and the references to the other codes have been deleted, as pointed out are not covered under the scope of this chapter of the IBC and therefore should not be included. This is an editorial change in nature and does not make any technical changes to the IBC.

In the IMC, Chapter 8 was missed. In Chapter 7 the new section titles were missed. These revisions would be consistent with what was approved for the remainder of the IMC chapters.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As noted in the reason statement, this is an editorial change that has no economic impact on the cost of construction.

Comment (CAH2)# 425

G1-24 Part VIII

IFC: 301.1, 401.1, 601.1, 701.1, 801.1, 901.1, SECTION 1001, 1001.1, [BE] 1001.2, 1101.1, 1201.1, 2001.1, 2101.1, 2201.1, 2201.1.1 (New), 2301.1, 2401.1, 2501.1, 2501.1.1 (New), 2701.1, 2801.1, 2901.1, 2901.1.1 (New), 3001.1, 3101.1, 3101.1.1 (New), 3201.1, 3301.1, 3401.1, 3401.1.1 (New), SECTION 3601, 3601.1, 3701.1, 3801.1, 3801.2, 3801.2.1 (New), 3801.2.2 (New), 3901.1, 3901.1.1 (New), 4001.1, 4101.1, 4101.1.1 (New), 5001.1, 5001.1.1, 5101.1, 5301.1, 5301.1.1, 5301.1.2, 5303.1, 5401.1, 5401.1.1 (New), 5501.1, 5501.1.1 (New), 5501.1.2 (New), 5601.1, 5601.1.1, 5601.1.2, 5701.1, 5701.2, 5801.1, 5801.1.1 (New), 5801.1.2 (New), 5901.1, 6001.1, 6001.1.1 (New), 6201.1, 6301.1, 6301.1.1 (New), 6301.1.2 (New), 6401.1, 6401.1.1 (New), 6501.1, 6601.1, 6601.1.1 (New), 6601.1.2 (New), 6701.1, 6701.1.1 (New); IWUIC: 301.1, 401.1, 401.3, 501.1, 501.1.1 (New), 601.1

Proposed Change as Submitted

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2024 International Fire Code

CHAPTER 3
GENERAL REQUIREMENTS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter shall govern the occupancy~~ Occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire and general requirements of fire safety shall comply with this chapter.

CHAPTER 4
EMERGENCY PLANNING AND PREPAREDNESS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. Reporting of emergencies, coordination with emergency response forces, emergency plans and procedures for managing or responding to emergencies shall comply with ~~the provisions of this section~~ this chapter. **Exception:** Firms that have *approved* on-premises firefighting organizations and that are in compliance with *approved* procedures for fire reporting.

CHAPTER 6
BUILDING SERVICES AND SYSTEMS

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~The provisions of this chapter shall apply to the installation, operation, testing and maintenance of the~~ The following building services and systems~~shall comply with this chapter~~:

1. Electrical systems, equipment and wiring.
2. Information technology server rooms.
3. Elevator systems, emergency operation and recall.
4. Fuel-fired appliances, heating systems, chimneys and fuel oil storage.
5. Commercial cooking equipment and systems.
6. Commercial cooking oil storage.
7. Mechanical refrigeration systems.
8. Hyperbaric facilities.
9. Clothes dryer exhaust systems.

CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

SECTION 701
GENERAL

Revise as follows:

701.1 Scope. ~~The provisions of this chapter shall govern the inspection~~ Inspection and maintenance of ~~the materials, systems and assemblies used for structural *fire resistance*, *fire resistance rated* construction separation of adjacent spaces and construction installed to resist the passage of smoke to safeguard against the spread of~~ fire and smoke protection features in ~~within a building and the spread of fire to or from~~ buildings shall comply with this chapter. ~~New buildings shall comply with the *International Building Code*.~~ .

CHAPTER 8
INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

SECTION 801
GENERAL

Revise as follows:

801.1 Scope. ~~The provisions of this chapter shall govern interior~~ Interior finish, interior trim, furniture, furnishings, decorative materials and decorative vegetation in buildings~~shall comply with this chapter~~. ~~Existing buildings shall comply with Sections 803 through 808. New buildings shall comply with Sections 804 through 808, and Section 803 of the International Building Code.~~

CHAPTER 9
FIRE PROTECTION AND LIFE SAFETY SYSTEMS

SECTION 901
GENERAL

Revise as follows:

901.1 Scope. ~~The provisions of this chapter shall specify where~~ Where *fire protection* and *life safety systems* are required by this chapter, ~~and shall apply to~~ the design, installation, inspection, operation, testing and maintenance of all *fire protection* and *life safety systems* shall comply with this chapter.

CHAPTER 10
MEANS OF EGRESS

Revise as follows:

SECTION 1001
~~ADMINISTRATION~~GENERAL

1001.1 ~~General~~ Scope. Buildings or portions thereof shall be provided with a *means of egress* system ~~as required by~~ and shall comply with this chapter. The provisions of this chapter shall control the design, construction, ~~and~~ arrangement and maintenance of *means of egress* components required to provide an *approved means of egress* from structures and portions thereof. ~~Sections 1003 through 1031 shall apply to new construction. Section 1032 shall apply to existing buildings.~~ **Exception:** Detached one- and two-family *dwellings* and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

[BE] 1001.2 ~~Minimum requirements~~General. It shall be unlawful to alter a building or structure in a manner that will reduce the number of *exits* or the capacity of the *means of egress* to less than required by this code.

CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

SECTION 1101
GENERAL

Revise as follows:

1101.1 Scope. ~~The provisions of this chapter shall apply to existing~~ Existing buildings constructed prior to the adoption of this code shall comply with this chapter.

CHAPTER 12
ENERGY SYSTEMS

SECTION 1201
GENERAL

Revise as follows:

1201.1 Scope. ~~The provisions of this chapter shall apply to the installation~~ Installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy, including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency shall comply with this chapter. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is

under the exclusive control of an electric utility or lawfully designated agency. Energy storage systems regulated by Section 1207 shall comply with this chapter, as appropriate, and NFPA 855.

CHAPTER 20
AVIATION FACILITIES

SECTION 2001
GENERAL

Revise as follows:

2001.1 Scope. Airports, heliports, helistops and aircraft hangars shall comply ~~be in accordance~~ with this chapter.

CHAPTER 21
DRY CLEANING

SECTION 2101
GENERAL

Revise as follows:

2101.1 Scope. Dry cleaning plants and their operations shall comply with ~~the requirements of~~ this chapter.

CHAPTER 22
COMBUSTIBLE DUST-PRODUCING OPERATIONS

SECTION 2201
GENERAL

Revise as follows:

2201.1 Scope. The equipment, processes and operations involving dust explosion hazards and use or handling of *combustible dust* shall comply with ~~the provisions of~~ this chapter.

~~**Exceptions:**~~

1. ~~Storage and use of consumer materials in Group B or R occupancies.~~
2. ~~Storage and use of commercially packaged materials in Group M occupancies.~~
3. ~~Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.~~
4. ~~Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.~~
5. ~~Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.~~

Add new text as follows:

2201.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of *combustible dust* at facilities not associated with an operation that uses, handles or generates *combustible dust*.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.

CHAPTER 23
MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION 2301
GENERAL

Revise as follows:

2301.1 Scope. Public and private automotive ~~Automotive~~ motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall comply ~~be in accordance~~ with this chapter ~~and the *International Building Code*, *International Fuel Gas Code* and *International Mechanical Code*. Such operations shall include both those that are open to the public and private operations~~.

CHAPTER 24
FLAMMABLE FINISHES

SECTION 2401
GENERAL

Revise as follows:

2401.1 Scope. ~~This chapter shall apply to locations or areas where any of the~~ The following activities shall comply with this chapter: ~~are conducted:~~

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of *flammable* or *combustible liquids* for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).

CHAPTER 25
FRUIT AND CROP RIPENING

SECTION 2501
GENERAL

Revise as follows:

2501.1 Scope. Ripening processes where ethylene gas is introduced into a room to promote the ripening of fruits, vegetables and other crops shall comply with this chapter.

~~**Exception:** Mixtures of ethylene and one or more inert gases in concentrations that prevent the gas from reaching greater than 25 percent of the lower explosive limit (LEL) when released to the atmosphere.~~

Add new text as follows:

2501.1.1 Non-applicability. This chapter shall not apply to mixtures of ethylene and one or more inert gases in concentrations that prevent the gas from reaching greater than 25 percent of the lower explosive limit (LEL) when released to the atmosphere.

CHAPTER 27
SEMICONDUCTOR FABRICATION FACILITIES

SECTION 2701
GENERAL

Revise as follows:

2701.1 Scope. Semiconductor fabrication facilities and comparable ~~research and development~~ areas classified as Group H-5 shall comply with this chapter. ~~and the *International Building Code*.~~ The use, storage and handling of hazardous materials in Group H-5 shall comply with this chapter~~,~~ and other applicable provisions of this code. ~~and the *International Building Code*.~~

CHAPTER 28
LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

SECTION 2801
GENERAL

Revise as follows:

2801.1 Scope. The storage, manufacturing and processing of solid biomass feedstock, timber, lumber, plywood, veneers and agro-industrial byproducts shall ~~be in accordance~~ comply with this chapter.

CHAPTER 29
MANUFACTURE OF ORGANIC COATINGS

SECTION 2901
GENERAL

Revise as follows:

2901.1 Scope. Organic coating manufacturing processes shall comply with this chapter., ~~except that this chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.~~

Add new text as follows:

2901.1.1 Non-applicability.. This chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.

CHAPTER 30
INDUSTRIAL OVENS

SECTION 3001
GENERAL

Revise as follows:

3001.1 Scope. ~~This chapter shall apply to the installation~~ Installation and operation of industrial ovens and furnaces shall comply with this chapter, and applicable provisions of ~~the *International Fuel Gas Code*, the *International Mechanical Code*,~~ NFPA 86~~, and this chapter~~. The terms “ovens” and “furnaces” are used interchangeably in this chapter.

CHAPTER 31
TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

SECTION 3101
GENERAL

Revise as follows:

3101.1 Scope. *Tents*, temporary special event structures and *membrane structures* shall comply with this chapter. ~~The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*. The provisions of Section 3105 are applicable to temporary special event structures. The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107are applicable to outdoor assembly events. Other temporary structures shall comply with the *International Building Code*.~~

Add new text as follows:

3101.1.1 Applicability. The following applies as follows:

1. The provisions of Section 3103 are applicable only to temporary *tents* and *membrane structures*.
2. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent *tents* and *membrane structures*.
3. The provisions of Section 3105 are applicable to temporary special event structures.
4. The provisions of Section 3106 are applicable to inflatable amusement devices.
5. The provisions of Section 3107 are applicable to outdoor assembly events.
6. Other temporary structures not covered by this chapter shall comply with the *International Building Code*.

CHAPTER 32
HIGH-PILED COMBUSTIBLE STORAGE

SECTION 3201
GENERAL

Revise as follows:

3201.1 Scope. *High-piled combustible storage* shall ~~be in accordance~~ comply with this chapter. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Aerosols shall be in accordance with Chapter 51.
2. *Flammable* and *combustible liquids* shall be in accordance with Chapter 57.
3. Hazardous materials shall be in accordance with Chapter 50.
4. Storage of combustible paper records shall be in accordance with NFPA 13.
5. Storage of *combustible fibers* shall be in accordance with Chapter 37.
6. General storage of combustible material shall be in accordance with Chapter 3.

CHAPTER 33
FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

SECTION 3301
GENERAL

Revise as follows:

3301.1 Scope. ~~This chapter shall apply to structures~~ Structures in the course of construction, *alteration* or demolition, including those in underground locations shall comply with this chapter. Compliance with NFPA 241 is required for items not specifically addressed herein.

CHAPTER 34
TIRE REBUILDING AND TIRE STORAGE

SECTION 3401
GENERAL

Revise as follows:

3401.1 Scope. Tire rebuilding plants, tire storage and tire byproduct facilities shall comply with this chapter~~,~~ and other applicable requirements of this code ~~and NFPA 13. Tire storage in buildings shall also comply with Chapter 32.~~

Add new text as follows:

3401.1.1 Additional Requirements. The following shall also apply.

1. The rubber tire protection requirements of NFPA 13.
2. Storage of tires shall comply with Chapter 32.

CHAPTER 36
MARINAS

Revise as follows:

SECTION 3601
~~SCOPE~~GENERAL

3601.1 Scope. Marina facilities shall ~~be in accordance~~ comply with this chapter.

CHAPTER 37
COMBUSTIBLE FIBERS

SECTION 3701
GENERAL

Revise as follows:

3701.1 Scope. ~~The equipment~~Equipment, processes and operations involving *combustible fibers* shall comply with this chapter.

CHAPTER 38
HIGHER EDUCATION LABORATORIES

SECTION 3801
GENERAL

Revise as follows:

3801.1 Scope. Higher education laboratories ~~complying with the requirements of this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in *control areas* set forth in Chapter 50 without requiring classification as a Group H occupancy~~ shall comply with this chapter. Except as specified in this chapter, such laboratories shall comply with all applicable provisions of this code.~~and the *International Building Code*.~~

3801.2 Application. The provisions of this chapter shall be applied as exceptions or additions to applicable requirements of this code. ~~Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions in Chapters 50 through 67 and the *International Building Code* for quantities not exceeding the maximum allowable quantity.~~

Add new text as follows:

3801.2.1 Materials exceeding the Maximum Allowable Quantity. Occupancies complying with this chapter shall be permitted to exceed the maximum allowable quantities of hazardous materials in control areas set forth in Chapter 50 without requiring classification as a Group H occupancy

3801.2.2 Materials not exceeding the Maximum Allowable Quantity . Unless specifically modified by this chapter, the storage, use and handling of hazardous materials shall comply with the provisions of chapters 50 through 67 for quantities not exceeding the maximum allowable quantities.

CHAPTER 39
PROCESSING AND EXTRACTION FACILITIES

SECTION 3901
GENERAL

Revise as follows:

3901.1 Scope. Facilities where plant processing and solvent-based extraction are conducted, including but not limited to cultivation and related activities, pre-extraction or post-extraction, shall comply with this chapter and the *International Building Code*. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the *International Building Code*. ~~**Exception:** Greenhouses in compliance with Section 3112 of the *International Building Code* not utilizing carbon dioxide enrichment.~~

Add new text as follows:

3901.1.1 Non-applicability. This chapter shall not apply to greenhouses in compliance with Section 3112 of the *International Building Code* not utilizing carbon dioxide enrichment.

CHAPTER 40
STORAGE OF DISTILLED SPIRITS AND WINES

SECTION 4001
GENERAL

Revise as follows:

4001.1 ~~General~~Scope. ~~The storage~~Storage of distilled spirits and wines in barrels and casks shall comply with this chapter. ~~in addition to other applicable requirements of this code.~~

CHAPTER 41
TEMPORARY HEATING AND COOKING OPERATIONS

SECTION 4101 GENERAL. Section 4101.5 relocated from before 3107.13

Revise as follows:

4101.1 ~~General~~Scope. ~~The provisions of this chapter shall apply to the use~~ Use, operation, testing and maintenance of mobile and portable equipment and devices used for temporary heating and cooking shall comply with this chapter. Temporary heating and cooking operations with open flames shall also comply with any additional applicable requirements in Section 308

.

~~**Exception:** Temporary heating devices used in the course of construction, alteration and demolition of structures shall comply with Section 3304.~~

Add new text as follows:

4101.1.1 Non-applicability. This chapter shall not apply to temporary heating devices used in the course of construction, alteration and demolition of structures complying with Section 3304.

CHAPTER 50
HAZARDOUS MATERIALS—GENERAL PROVISIONS

SECTION 5001
GENERAL

Revise as follows:

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall ~~be in accordance~~ comply with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

~~**Exceptions:**~~

1. ~~In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).~~
2. ~~Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).~~
3. ~~Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.~~
4. ~~The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.~~
5. ~~Building materials not otherwise regulated by this code.~~
6. ~~Refrigeration systems (see Section 608).~~
7. ~~Stationary storage battery systems regulated by Section 1207.~~
8. ~~The display, storage, sale or use of fireworks and *explosives* in accordance with Chapter 56.~~
9. ~~*Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.~~
10. ~~The storage of beer, distilled spirits and wines in barrels and casks.~~
11. ~~The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.~~
12. ~~Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.~~
13. ~~Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.~~
14. ~~Storage and display of aerosol products complying with Chapter 51.~~
15. ~~Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.~~

~~16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.~~

~~17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.~~

Add new text as follows:

5001.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Retail or wholesale sales occupancies containing medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials complying with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems complying with Section 608.
7. Stationary storage battery systems complying with Section 1207.
8. The display, storage, sale or use of fireworks and *explosives* complying with Chapter 56.
9. *Corrosives* utilized in personal and household products in the manufacturer's original consumer packaging in retail or wholesale occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in complying with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas complying with Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment complying with Section 605. Abandonment of fuel oil tanks shall comply with Chapter 57.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of *flammable* or *combustible liquids* that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. *Flammable* or *combustible liquids* with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building complying with Section 607 and NFPA 30.

Revise as follows:

5001.1.2 ~~500.1.1.1~~ Waiver. The provisions of this chapter are waived where the *fire code official* determines that such enforcement is

preempted by other codes, statutes or ordinances. The details of any action granting such a waiver shall be recorded and entered in the files of the code enforcement agency.

CHAPTER 51
AEROSOLS

SECTION 5101
GENERAL

Revise as follows:

5101.1 Scope. ~~The provisions of this chapter, the *International Building Code* and NFPA 30B shall apply to the~~ Manufacturing, storage and display of aerosol products, aerosol cooking spray products and plastic aerosol 3 products shall comply with this chapter, and NFPA 30B . Manufacturing of aerosol products, aerosol cooking spray products and plastic aerosol 3 products using hazardous materials shall also comply with Chapter 50.

CHAPTER 53
COMPRESSED GASES

SECTION 5301
GENERAL

Revise as follows:

5301.1 Scope. Storage, use and handling of *compressed gases* in *compressed gas* containers, cylinders, tanks and compressed gas systems shall comply with this chapter and NFPA 55., ~~including those gases regulated elsewhere in this code. Partially full *compressed gas* containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required. Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.~~

~~*Compressed gases* classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable *Cryogenic Fluids*), 60 (Highly Toxic and Toxic Materials), 63 (*Oxidizers*, Oxidizing Gases and Oxidizing *Cryogenic Fluids*) and 64 (*Pyrophoric* Materials).Compressed hydrogen (CH_2) shall also comply with the applicable portions of Chapters 23 and 58 of this code, the *International Fuel Gas Code* and NFPA 2.Cutting and welding gases shall also comply with Chapter 35.~~

~~**Exceptions:**~~

1. ~~Gases used as refrigerants in refrigeration systems (see Section 608).~~
2. ~~Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, the *International Fuel Gas Code* and NFPA 52 .~~
3. ~~*Cryogenic fluids* shall comply with Chapter 55.~~
4. ~~LP-gas shall comply with Chapter 61 and the *International Fuel Gas Code*.~~

Add new text as follows:

5301.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Gases used as refrigerants in refrigeration systems complying with Section 608.

2. Compressed natural gas (CNG) for use as a vehicular fuel complying with Chapter 23 and NFPA 52.
3. *Cryogenic fluids* complying with Chapter 55.
4. LP-gas complying with Chapter 61.

5301.1.2 Additional Requirements. Compressed gasses shall also comply with the following:

1. Liquefied natural gas for use as a vehicular fuel shall comply with NFPA 52 and NFPA 59A.
2. Compressed gases classified as hazardous materials shall comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable Cryogenic Fluids), 60 (Highly Toxic and Toxic Materials), 63 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 64 (Pyrophoric Materials).
3. Compressed hydrogen shall comply with the applicable portions of Chapters 23 and 58 of this code, and NFPA 2.
4. Cutting and welding gases shall comply with Chapter 35.

Revise as follows:

5303.1 ~~Containers, cylinders and tanks~~ Compressed gas containers. *Compressed gas containers*~~, cylinders and tanks~~ shall comply with this section. ~~*Compressed gas* containers, cylinders or tanks that are not designed for refillable use shall not be refilled after use of the original contents.~~

Add new text as follows:

5303.1.1 Partially filled compressed gas containers. Partially full compressed gas containers containing residual gasses shall be considered as full for the purposes of the controls required.

5303.1.2 Refillable Compressed Gas Containers. Compressed gas containers that are not designed for refillable use shall not be refilled after the use of the original contents.

CHAPTER 54
CORROSIVE MATERIALS

SECTION 5401
GENERAL

Revise as follows:

5401.1 Scope. ~~The storage~~ Storage and use of *corrosive* materials shall comply ~~be in accordance~~ with this chapter. *Compressed gases* shall also comply with Chapter 53. ~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Stationary storage battery systems in accordance with Section 1207.~~
3. ~~This chapter shall not apply to R-717 (ammonia) where used as a refrigerant in a refrigeration system (see Section 608).~~

Add new text as follows:

5401.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Refrigeration systems complying with section 608.
3. Stationary Battery Storage systems complying with section 1207

CHAPTER 55
CRYOGENIC FLUIDS

SECTION 5501
GENERAL

Revise as follows:

5501.1 Scope. Storage, use and handling of *cryogenic fluids* shall comply with this chapter and NFPA 55. ~~*Cryogenic fluids* classified as hazardous materials shall also comply with the general requirements of Chapter 50. Partially full containers containing residual *cryogenic fluids* shall be considered as full for the purposes of the controls required.~~ ~~**Exceptions:**~~

1. ~~Fluids used as refrigerants in refrigeration systems (see Section 608).~~
2. ~~Liquefied natural gas (LNG), which shall comply with NFPA 59A.~~

~~Oxidizing *cryogenic fluids*, including oxygen, shall comply with Chapter 63, as applicable.~~
~~Flammable *cryogenic fluids*, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58, as applicable.~~

~~Inert *cryogenic fluids*, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.~~

Add new text as follows:

5501.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Fluids used as refrigerants in refrigeration systems complying with Section 608.
2. Liquefied natural gas (LNG) complying with NFPA 59A.

5501.1.2 Additional Requirements. *In addition to the requirements of this chapter, the following shall also apply:*

1. *Cryogenic fluids* classified as hazardous materials shall comply with the general requirements of Chapter 50.
2. Partially full containers containing residual *cryogenic fluids* shall be considered as full for the purposes of the controls required.
3. Oxidizing *cryogenic fluids*, including oxygen, shall comply with Chapter 63.
4. Flammable *cryogenic fluids*, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58.
5. Inert *cryogenic fluids*, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.

CHAPTER 56
EXPLOSIVES AND FIREWORKS

SECTION 5601
GENERAL

Revise as follows:

5601.1 Scope. ~~The provisions of this chapter shall govern the possession~~ Possession, manufacture, storage, handling, sale and use of *explosives*, *explosive materials*, fireworks and small arms ammunition shall comply with this chapter. ~~**Exceptions:**~~

1. ~~The Armed Forces of the United States, Coast Guard or National Guard.~~
2. ~~*Explosives* in forms prescribed by the official United States Pharmacopoeia.~~
3. ~~The possession, storage and use of small arms ammunition where packaged in accordance with DOTn packaging requirements.~~
4. ~~The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.~~
5. ~~The use of *explosive materials* by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.~~
6. ~~Special industrial *explosive* devices that in the aggregate contain less than 50 pounds (23 kg) of *explosive materials.*~~
7. ~~The possession, storage and use of blank industrial power load cartridges where packaged in accordance with DOTn packaging regulations.~~
8. ~~Transportation in accordance with DOTn 49 CFR Parts 100–185.~~
9. ~~Items preempted by federal regulations.~~

Delete and substitute as follows:

~~**5601.1.1 Explosive material standard.** In addition to the requirements of this chapter, NFPA 495 shall govern the manufacture, transportation, storage, sale, handling and use of *explosive materials* .~~

5601.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Where preempted by federal regulation, including use by the armed forces
2. Explosives in forms prescribed by the United States Pharmacopia.
3. Possession, storage and use of small arms ammunition and blank industrial-powerload cartridges where packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg)of commercially manufactured sporting black powder, 20 pounds (9 KG)of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state, and local regulatory law enforcement agencies acting in their official capacities
6. Special industrial explosive devices that in aggregate contain less than 50 pounds (23 KG) of explosive materials.
7. The off-site transportation of *explosive materials* where in accordance with Department of Transportation (DOTn) regulations.

~~**5601.1.2 Explosive material terminals.** In addition to the requirements of this chapter, the operation of *explosive material* terminals shall conform to the provisions of NFPA 498.~~

5601.1.2 Additional Requirements. In addition to the requirements of this chapter, the following shall also apply:

1. Operation of *explosive material* terminals shall comply with NFPA 498.

2. Manufacture, transportation, storage, sale, handling, and use of explosive materials shall comply with NFPA 495

CHAPTER 57
FLAMMABLE AND COMBUSTIBLE LIQUIDS

SECTION 5701
GENERAL

Revise as follows:

5701.1 Scope ~~and application.~~ Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of *flammable* and *combustible liquids* shall comply with this chapter and ~~be in accordance with~~ Chapter 50 ~~and this chapter~~ .

5701.2 Nonapplicability. This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for *flammable liquids* in motor fuel-dispensing facilities, repair garages, airports and marinas ~~in~~ complying with Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment~~. Such storage and use shall be in accordance~~ complying with Section 605. ~~For~~ Abandonment of fuel oil tanks~~,~~ shall comply with this chapter ~~applies~~.
5. Refrigeration systems complying with ~~(see~~ Section 608~~)~~.
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D92.
8. Liquids with a *flash point* greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without *flash points* that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in ~~accordance~~ compliance with Section 607 and NFPA 30.
12. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
13. The off-site transportation of *flammable* or *combustible liquids* where in accordance with Department of Transportation (DOTn) regulation.

CHAPTER 58
FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

SECTION 5801
GENERAL

Revise as follows:

5801.1 Scope. ~~The storage~~Storage and use of flammable gases and flammable *cryogenic fluids* shall comply ~~be in accordance~~ with this chapter, NFPA 2 and NFPA 55. ~~*Compressed gases* shall also comply with Chapter 53 and *cryogenic fluids* shall also comply with Chapter 55. Flammable *cryogenic fluids* shall comply with Section 5806. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall also be designed, constructed and maintained in accordance with Chapter 23.~~ **~~Exceptions:~~**

1. ~~Gases used as refrigerants in refrigeration systems (see Section 608).~~
2. ~~Liquefied petroleum gases and natural gases regulated by Chapter 61.~~
3. ~~Fuel-gas systems and appliances regulated under the *International Fuel Gas Code* other than gaseous hydrogen systems and appliances.~~
4. ~~*Pyrophoric* gases in accordance with Chapter 64.~~

Add new text as follows:

5801.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Gases used as refrigerants in refrigeration systems complying with Section 608.
2. Liquefied petroleum gases and natural gases complying with Chapter 61.
3. Fuel-gas systems and appliances regulated under the *International Fuel Gas Code* other than gaseous hydrogen systems and appliances.
4. *Pyrophoric* gases complying with Chapter 64

5801.1.2 Additional requirements. In addition to the requirements of this chapter, the following shall also apply:

1. *Compressed gases* shall comply with Chapter 53.
2. *Cryogenic fluids* shall comply with Chapter 55.
3. Flammable *cryogenic fluids* shall comply with Section 5806.
4. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall be designed, constructed and maintained in accordance with Chapter 23.

CHAPTER 59
FLAMMABLE SOLIDS

SECTION 5901
GENERAL

Revise as follows:

5901.1 Scope. ~~The storage~~Storage and use of flammable solids shall comply ~~be in accordance~~ with this chapter.

CHAPTER 60
HIGHLY TOXIC AND TOXIC MATERIALS

SECTION 6001
GENERAL

Revise as follows:

6001.1 Scope. ~~The storage~~Storage and use of highly toxic and toxic materials shall comply with this chapter. *Compressed gases* shall also comply with Chapter 53. ~~**Exceptions:**~~

~~1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~

~~2. Conditions involving pesticides or agricultural products as follows:~~

~~2.1. Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.~~

~~2.2. Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations thereunder.~~

~~2.3. Storage in *dwellings* or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.~~

Add new text as follows:

6001.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Conditions involving pesticides or agricultural products as follows:
   2.1. Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.
   2.2. Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations there under.
   2.3. Storage in *dwellings* or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.

CHAPTER 62
ORGANIC PEROXIDES

SECTION 6201

GENERAL

Revise as follows:

6201.1 Scope. ~~The storage~~Storage and use of *organic peroxides* shall comply ~~be in accordance~~ with this chapter and Chapter 50. Unclassified detonable *organic peroxides* that are capable of *detonation* in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

CHAPTER 63
OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

SECTION 6301
GENERAL

Revise as follows:

6301.1 Scope. ~~The storage~~Storage and use of oxidizing materials shall comply ~~be in accordance~~ with this chapter and Chapter 50. ~~Oxidizing gases shall also comply with Chapter 53. Oxidizing *cryogenic fluids* shall also comply with Chapter 55.~~ ~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Bulk oxygen systems at industrial and institutional consumer sites shall be in accordance with NFPA 55.~~
3. ~~Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies in accordance with Section 6306.~~

Add new text as follows:

6301.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Bulk oxygen systems at industrial and institutional consumer sites complying with NFPA 55.
3. Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies complying with Section 6306.

6301.1.2 Additional Requirements. In addition to the requirements of this chapter, the following shall also apply:

1. Oxidizing gases shall comply with Chapter 53.
2. Oxidizing *cryogenic fluids* shall comply with Chapter 55.

CHAPTER 64
PYROPHORIC MATERIALS

SECTION 6401
GENERAL

Revise as follows:

6401.1 Scope. ~~The storage~~Storage and use of *pyrophoric* materials shall comply ~~be in accordance~~ with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~

Add new text as follows:

6401.1.1 Additional requirements. Compressed gases shall also comply with Chapter 53.

CHAPTER 65
PYROXYLIN (CELLULOSE NITRATE) PLASTICS

SECTION 6501
GENERAL

Revise as follows:

6501.1 Scope. ~~This chapter shall apply to the storage~~ Storage and handling of plastic substances, materials or compounds with cellulose nitrate (pyroxylin) as a base, by whatever name known, in the form of blocks, sheets, tubes or fabricated shapes shall comply with this chapter.
Cellulose nitrate (pyroxylin) motion picture film shall comply with the requirements of Section 306.

CHAPTER 66
UNSTABLE (REACTIVE) MATERIALS

SECTION 6601
GENERAL

Revise as follows:

6601.1 Scope. ~~The storage~~ Storage and use of unstable (reactive) materials shall comply ~~be in accordance~~ with this chapter. ~~*Compressed gases* shall also comply with Chapter 53.~~ ~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Detonable unstable (reactive) materials shall be stored in accordance with Chapter 56.~~

Add new text as follows:

6601.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable unstable (reactive) materials shall be stored in compliance with Chapter 56.

6601.1.2 Additional Requirement. *Compressed gases* shall also comply with Chapter 53.

CHAPTER 67
WATER-REACTIVE SOLIDS AND LIQUIDS

SECTION 6701
GENERAL

Revise as follows:

6701.1 Scope. ~~The storage~~ Storage and use of water-reactive solids and liquids shall comply ~~be in accordance~~ with this chapter.
~~**Exceptions:**~~

1. ~~Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.~~
2. ~~Detonable water-reactive solids and liquids shall be stored in accordance with Chapter 56.~~

Add new text as follows:

6701.1.1 Non-applicability. This chapter shall not apply to any of the following:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable water-reactive solids and liquids stored in compliance with Chapter 56.

2024 International Wildland Urban Interface Code

CHAPTER 3
WILDLAND-URBAN INTERFACE AREAS

SECTION 301
GENERAL

Revise as follows:

301.1 Scope. ~~The provisions of this chapter provide methodology~~ Methodology for ~~to establish~~ establishing and ~~record~~ recording *wildland-urban interface areas* ~~based on the findings of fact~~ shall comply with this chapter..

CHAPTER 4
WILDLAND-URBAN INTERFACE AREA REQUIREMENTS

SECTION 401
GENERAL

Revise as follows:

401.1 Scope. The following items occurring in *Wildland-urban interface areas* shall comply with this chapter: ~~be provided with emergency vehicle access and water supply in accordance with this chapter.~~

1. Subdivisions
2. Fire Apparatus Access
3. Water Supply

4. Fire Protection Plans

401.3 General safety precautions. General safety precautions shall comply ~~be in accordance~~ with this chapter. ~~See also Appendix A.~~

CHAPTER 5
SPECIAL BUILDING CONSTRUCTION REGULATIONS

SECTION 501
GENERAL

Revise as follows:

501.1 Scope. Buildings and structures shall be constructed in compliance ~~accordance~~ with this chapter ~~the *International Building Code*~~ and ~~this code~~ applicable Building Code. ~~**Exceptions:**~~

1. ~~Accessory structures not exceeding 120 square feet (11 m^2) in floor area where located not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~
2. ~~Agricultural buildings not less than 50 feet (15 240 mm) from buildings containing habitable spaces.~~

Add new text as follows:

501.1.1 Additional Requirements. In addition to complying with the applicable building code, the following types of structures shall comply with this code:

1. Accessory Structures not exceeding 120 square feet (11 m^2) in floor area located less than 50 feet (15240 mm) from buildings containing habitable spaces.
2. Agricultural buildings less than 50 feet from buildings containing habitable spaces.

CHAPTER 6
FIRE PROTECTION REQUIREMENTS

SECTION 601
GENERAL

Revise as follows:

601.1 Scope. ~~The provisions of this chapter establish general requirements for new and existing buildings, structures and premises located within *wildland-urban interface areas.*~~
Mitigation of hazards from fire in wildland urban interface areas shall comply with this chapter.

Reason: Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained. The Scoping Task group proposes that the recommended changes will improve the code by:

1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As stated in the reason statement, these proposed changes are editorial, there is no cost impact on the cost of construction.

G1-24 Part VIII

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal makes the code more consistent throughout and eliminates laundry lists which have been problematic. (Vote 13-0)

G1-24 Part VIII

Individual Consideration Agenda

Comment 1:

IWUIC: CHAPTER 5, SECTION 501, 501.1, 501.1.1, CHAPTER 6, SECTION 601, 601.1

Proponents: Milad Shabanian, Insurance Institute for Buisness & Home Safety (mshabanian@ibhs.org); T. Eric Stafford, Insurance Institute for Business and Home Safety (testafford@charter.net) requests As Modified by Committee (AMC2)

Modify as follows:

CHAPTER 5
SPECIAL BUILDING CONSTRUCTION REGULATIONS

SECTION 501
GENERAL

Revise as follows:

501.1 Scope. Buildings and structures shall be constructed in compliance with this chapter and applicable Building Code.
Exceptions:

1. Accessory structures not exceeding 120 square feet (11 m^2) in floor area where located not less than 50 feet (15 240 mm) from buildings containing habitable spaces.
2. Agricultural buildings not less than 50 feet (15 240 mm) from buildings containing habitable spaces.

Delete without substitution:

~~**501.1.1 Additional Requirements.** In addition to complying with the applicable building code, the following types of structures shall comply with this code:~~

1. ~~Accessory Structures not exceeding 120 square feet (11 m^2) in floor area located less than 50 feet (15240 mm) from buildings containing habitable spaces.~~
2. ~~Agricultural buildings less than 50 feet from buildings containing habitable spaces.~~

CHAPTER 6
FIRE PROTECTION REQUIREMENTS

SECTION 601
GENERAL

Delete and substitute as follows:

~~**601.1 Scope.** -~~
~~Mitigation of hazards from fire in wildland urban interface areas shall comply with this chapter.~~

601.1 Scope. The provisions of this chapter establish general requirements for new and existing buildings, structures and premises located within wildland-urban interface areas.

Reason: While IBHS supports the efforts to make the scoping sections across the I-codes consistent, the proposed changes to the IWUIC are not editorial. These changes to the IWUIC significantly alter its scope and will considerably weaken the IWUIC provisions.

The exception to Section 501.1 currently exempts accessory structures not exceeding 120 square feet where located not less than 50 feet from buildings containing habitable spaces. The proposed new language states that accessory structures not exceeding 120 square feet and located less than 50 feet from a building containing habitable space have to comply with this code. So, an acccessory structure with a floor area exceeding 120 square feet located less than 50 feet from a building containing habitable space would not be required to comply with this code. This is nonsensical. If this proposal were approved, a larger accessory structure located within 50 feet of a

building with habitable space would be exempt from the IWUIC but smaller one would be required to comply.

Additionally, the changes proposed to Chapter 6 in IWUIC completely change its scope. The scope in the 2024 IWUIC makes it clear that it applies to new and existing buildings. The new language deletes the reference to existing buildings altogether.

This comment essentially changes the provisions of Sections 50.1 and 601.1 of the IWUIC back to the language that currently exists in the 2024 IWUIC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

-

Comment (CAH2)# 719

G2-24

IBC: SECTION 202 (New); IFC: SECTION 202 (New)

Proposed Change as Submitted

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Add new definition as follows:

CLINICAL NEED. A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.

2024 International Fire Code

Add new definition as follows:

CLINICAL NEED. A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.

Reason: Certain sections of the code allow certain conditions based the clinical needs of the occupants. However, there has not been an official definition for what “clinical need” means and it has been widely interpreted. This proposal seeks to clear up confusion and create a common ground of understanding.

The term Clinical Need is most often found in conjunction with Group I-1 and I-2 occupancies. Certain groups of occupants within these settings require different levels of protections. There are references to the term Clinical Need in several sections, primarily having reference to locking of doors: IBC/IFC (2021 section references) 1010.2.4, 1010.2.13.1 and 1010.2.14, IEBC Section 804.14.2 (2024 reference) and one mention in relation to smoking: IFC Section 310.2.

The purpose of this change is to establish the basis for what is known as clinical need. This is a relatively short definition, but speaks to the component of how a patient in a hospital, or resident of a nursing home or assisted living setting, often have a security need that presents itself more urgently than a life-safety/egress need.

The word “known” is purposefully used related to care, and can take many forms. Court orders are a primary example of the need to put a behavioral health patient in a locked unit, and this is known on admission. Doctor’s orders are also commonly issued, particularly for individuals suffering from cognitive issues, and need to be placed into specialty units with extra security to protect them from harm. These factors become known at the time of placement.

“Welfare risk” is also purposefully used phrasing. A primary example of a welfare risk to a care recipient would be a memory care/dementia unit, where wandering throughout or outside of the building could put that individual in grave risk because of not being fully aware if their surroundings. A closed, locked unit represents the safest environment for their condition.

Similarly, many elders in assisted living have balance and gait issues that make regular use of stairways dangerous. As stair towers are not regularly used or observed, if a resident gets into the stair and falls, this can be a fatal event. Locking these stair tower doors, during non-emergency conditions, is the only way to prevent this.

Another, very common welfare risk is in maternity and neo-natal intensive care units where child abduction is a continual threat. Having the ability to lock doors for stair towers and other exits is critical to preventing this.

“Necessitates” is a term used to set up the scope of the individual technical requirements of the code chapters. By formulating this wording, the working group from the Committee for Healthcare (CHC) took particular care not to bury code requirements in the definition, to avoid creating more confusion. The locations where “clinical need” is already used in the code were reviewed and discussed, and it was determined that the technical requirements around clinical need for the specific section (such as, door locking) was covered in a better way. It did not do the definition well to try and cover each and every technical requirement.

Due to patient privacy laws, specific orders relating to patient or resident care cannot be released as part of justification for the construction of an environment appropriate for care. However, the level of care needed can be provided by the design professional representing the owner/care provider specific to the known care or welfare risk to care recipients. It is reasonable for an AHJ to request a narrative or functional program from the Design team or Owner/care provider as part of the approval process.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this definition will not add or decrease any construction costs. Yes, the implementation of special locking provisions does add cost to the project. However, the code sections that refer to this definition are already in the code. This definition simply adds clarity.

G2-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The new definition was disapproved because the committee felt this was too broad and could be misused. While this is a term currently used in the medical field, it was not clear on who would determine if there was a need. (Vote 10-4)

G2-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IFC: SECTION 202

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

CLINICAL NEED. ~~A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.~~
An enhanced level of safety or security required to address care or welfare risks for care recipients.

2024 International Fire Code

CLINICAL NEED. ~~A known care or welfare risk to care recipients that necessitates an enhanced level of safety or security.~~
An enhanced level of safety or security required to address care or welfare risks for care recipients.

Reason: The language of the definition was revised to better describe the need, and to attempt to better address some of the Committee's concerns. This new definition is simply trying to provide additional guidance for a term that is already used in the code. The definition of clinical need provides owners, designers and regulatory officials with the ability to identify those care recipients that are subject to known care or welfare risk.

A question was raised by the Committee about who would make the determination of a "welfare or care risk". This was one reason why the definition was revised to remove the term "known risk", and to remove that obligation of judgement from the AHJ.

Because things like special locking arrangements need to be included into the construction documents, the determination of clinical needs, for certain areas of the building, is discussed between the Owner and the Design team during the design and documentation process. The Owner/Operator makes the clinical needs determination based on the care recipients they intend to serve. It would be reasonable for an AHJ to request a narrative or functional program from the design team and/or the Owner/Operator as part of the approval process. It would also be expected that the areas designated as having care recipients with these clinical needs, and the operations of doors, staff responsibilities and the like would be included in the Fire Safety and Evacuation plans, which are required by IFC Section 403.7

Most State and Federal regulatory agencies, like the Department of Health or CMS require care providers to provide written notification to Assisted Living and Nursing Home care recipients, or their families, that they will be placed in a secured unit for their safety and/or security. In this case, the care recipient, or their family, can choose not to move in if they do not agree to the added safety measures.

The Committee raised concerns that this definition "could be used in a negative way…to secure people", and "could be used to lock people down in a hospital". The allowance to "lock down people in a hospital" already exists in the code, with the appropriate safeguards. This definition does not change that, it simply defines an already used term in the code.

Existing IBC Section 1010.2.4 (2) already allows this provision: "Locks and latches shall be permitted to prevent operation of doors…In Group 1-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times…" IBC Section 1010.2.13 also currently allows controlling egress doors with electrical locking.

Not all care recipients have special care or welfare risks. However, there are a number of clinical reasons why certain care recipients require special containment, in specific areas, on an ongoing basis. These are widely known and understood care and welfare risks in the care industry. Delayed Egress locking arrangements are not sufficient to contain determined care recipients. (They can easily read and follow the instructions on the signs, and they can be surprisingly fast!) These known care and welfare risks are a larger risk to care recipient's daily health and safety, than a much rarer fire or other emergency event. However, safeguards are already built into the Building and Fire Code to address life safety should a fire or other emergency occur.

These clinical settings, and care recipients with specifically known risks include, but are not limited to:

· Maternity, neo-natal and pediatric units to prevent abductions of children. This is a welfare risk. These units commonly incorporate an enhanced level of safety or security which includes a locking strategy leading in and out of those areas.

· Behavioral Health settings (psychiatric and substance abuse) to prevent care recipients from eloping, harming themselves or staff. This is a care risk. A care recipient may occasionally have a Court Order requiring them to be placed in a specially secured unit.

· Memory support/Dementia care units to prevent residents from eloping. This is both a care and a welfare risk.

· Stairways in Skilled Nursing or Assisted Living Buildings: Many elders in care settings have mobility, gait or balance issues that make the use of stairways dangerous. If a care recipient were to access the stairway and fall, it can result in serious injury or even death. Stairways in these care settings are generally not used, and are not observed by staff, which makes any fall more life-threatening. This is a welfare risk.

Please refer to our previous reason statement for additional background and reasoning.

The model codes and subsequent definitions are specific to building construction, occupancy and maintenance. Patient and resident care plans as well as patient and resident rights are not determined on the basis of the model building and fire codes. The model building and fire codes are established and continually evaluated and updated to align with patient and resident care plans as well as patient and resident rights.

Here are a couple of recent examples that made the news.

https://www.nbcnews.com/news/us-news/woman-posed-nurse-tried-steal-newborn-california-hospital-officials-sa-rcna39064
https://wsvn.com/news/local/florida/sheriff-florida-woman-steals-baby-from-nicu-stabs-hospital-staff-members-in-incident-at-palms-west-hospital/https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10381052/
https://www.ncbi.nlm.nih.gov/books/NBK305246/

https://pubmed.ncbi.nlm.nih.gov/15633945/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of this definition will not add or decrease any construction costs. Yes, the implementation of special locking provisions does add cost to the project. However, the code sections that refer to this definition are already in the code. This definition simply adds clarity to meaning of the term within the existing text.

Comment (CAH2)# 199

G3-24

IBC: SECTION 202; IFC: SECTION 202

Proposed Change as Submitted

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

[BE] EXIT ACCESS. That portion of a *means of egress* system that leads from any occupied portion of a *building* or *structure* to an *exit*.

Revise as follows:

[BE] EXIT ACCESS RAMP. ~~A~~ An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

[BE] EXIT ACCESS STAIRWAY. ~~A~~ An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps*, point identified by the r*egistered design professional* between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

2024 International Fire Code

[BE] EXIT ACCESS. That portion of a *means of egress* system that leads from any occupied portion of a building or structure to an *exit*.

Revise as follows:

[BE] EXIT ACCESS RAMP. ~~A~~ An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

[BE] EXIT ACCESS STAIRWAY. ~~A~~ An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps*, a point identified by the r*egistered design professional* between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

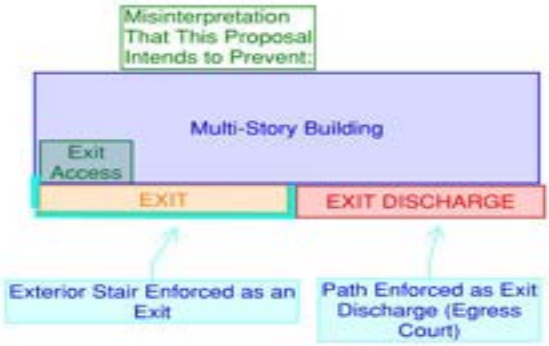
Reason: This proposal serves to resolve two ambiguities – clearly identifying that exit stairs are permitted to serve as exit access, and clarifying where the exit starts after an exterior exit access stair. An exit access stairway is permitted at the exterior of the building.

Code change E7-12/13 deleted the word “interior” from the definition of *exit access stairway and ramp* so that the provisions which allow an unenclosed exit access stair would be equally applicable to interior or exterior stairways. However, *exterior exit stairway* provisions of IBC 1027 can be mistakenly applied to *exit access stairways* located exterior to the building. Reviewers often see an exterior stair and enforce exterior exit requirements. However, if the stair is permitted to serve as exit access rather than as an exit, the exterior exit stairway requirements of 1027 are not required and often erroneously enforced. The proposed change intends to emphasize that an exit access stairway is permitted at the exterior.

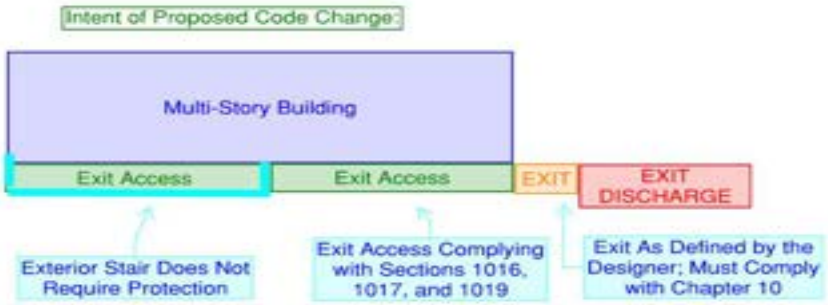
Code change E7-12/13 did not provide an obvious *exit* component for the means of egress after an exterior *exit access stairway*. The definition of *exit* is amended to identify that the *exit* component exists after an exterior *exit access stairway*. While an easy solution would be to define the exit as the bottom of the exterior *exit access stair*, there are configurations where redundant protection would be required if the travel after an exterior *exit access stair* were defined as *exit* and *exit discharge*. For example, where an *exit access stair* ends along a path adjacent to an exterior wall, that path could require egress court protection. However, under the same logic as previous code change E7-12/13, if that path were interior to the building, it would not require separation from the building. Therefore, by defining that

path as a continuation of exit access (rather than defining the bottom of the stair as an exit, thus the path as exit discharge), the exit access does not require rated protection. This change would allow a designer to propose any point after an exterior exit access stair as a the *exit*. That said, the defined *exit* must still meet all requirements of Chapter 10, such as travel distance and protection. Some figures below are provided for reference.


Example Configuration:
Multi-Story Building
Path of Travel, <10' Wide
Exterior Stair From Level 2 Which Provides Travel Down One Story


Misinterpretation That This Proposal Intends to Prevent:
Multi-Story Building
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Enforced as an Exit
Path Enforced as Exit Discharge (Egress Court)


Issue with "easy solution" to define the exit as the bottom of the exterior exit access stair:
Multi-Story Building
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Does Not Require Protection
Path Enforced as Exit Discharge (Egress Court)


Intent of Proposed Code Change:
Multi-Story Building
Exit Access
Exit Access
EXIT
EXIT DISCHARGE
Exterior Stair Does Not Require Protection
Exit Access Complying with Sections 1016, 1017, and 1019
Exit As Defined by the Designer; Must Comply with Chapter 10

Bibliography: https://www.iccsafe.org/wp-content/uploads/02_IBC-E1.pdf

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

Assuming a Type IIIA Group R-2 building utilizes this configuration, ICC estimates that the cost of constructing an unrated enclosure along the exit access path to be $177.77/sf.

Estimated Immediate Cost Impact Justification (methodology and variables):

Under the justification that this proposal is similar to E7 12/13, such that an equivalent interior space after an exit access stair would be permitted as unrated, this proposal saves the cost of that hypothetical construction.

G3-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved because this issue should be addressed in the code text - this is not something that could be addressed by a change in definitions. Clearly addressing an exterior exit discharge stairway in the text might address some of the issues brought up in the testimony. Requirements should be clearly defined on what is going on on the outside of the building and the protection to address different associated hazards that are present on the exterior versus the interior exit or exit access stairways. Some buildings do not require "registered design professionals" in every state, so who would set this 'point'. (Vote 11-3)

G3-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IFC: SECTION 202

Proponents: Gabriel Levy, incandescence life safety, inc, Colorado Chapter Code Development Committee (glevy@incandescencels.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

[BE] EXIT ACCESS RAMP. An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

[BE] EXIT ACCESS STAIRWAY. An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components

include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps,* a point identified by the ~~registered~~ design professional between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

2024 International Fire Code

[BE] EXIT ACCESS RAMP. An interior or exterior *ramp* within the *exit access* portion of the *means of egress* system.

[BE] EXIT ACCESS STAIRWAY. An interior or exterior *stairway* within the *exit access* portion of the *means of egress* system.

[BE] EXIT. That portion of a *means of egress* system between the *exit access* and the *exit discharge* or *public way*. Exit components include exterior exit doors at the *level of exit discharge*, *interior exit stairways* and *ramps*, *exit passageways*, exterior exit *stairways* and *ramps,* a point identified by the ~~registered~~ design professional between an exterior *exit access stairway or ramp* and the *public way*, and *horizontal exits*.

Reason: Beyond the justification provided in the original code proposal, the following responds to comments and questions made by the committee during CAH1 testimony.

Committee Question: Have you considered the situation where the exterior portion [of exit access travel] is near a lot line? If the egress component is interior of the building, and the exterior wall is near a lot line, the code provides requirements for that wall to be rated. In your proposal, where the path is now outside the building, have you considered the situation where that path may be near a lot line?

Response: The hazard identified by this comment seems to only be applicable if an adjacent building is on fire. In that instance, flames or smoke from an adjacent building could potentially block usage of the exterior exit access path proposed by this code change. While this risk is legitimate, it is a hazard that is currently not addressed by code. An egress court or other exterior exit discharge path does not require separation from adjacent buildings. Why should an exterior exit access path? Especially considering that the code already allows for an exterior exit access stair to be along a lot line - there is no reason why the flat path after the exit access stair should require protection.

Committee Question: Would you be against striking the term "registered" from the defined design professional responsible for determining the point of exit?

Response: The committee identifies that some jurisdictions do not require a *registered design professional.* Therefore, the word "registered" has been deleted in this modification, such that design professional is used as an undefined term, which has an ordinarily accepted meaning such as the context implies, per IBC 201.4.

Committee Question: Have you considered the unintended consequence of requiring manual pull stations or exit signs exterior to the building at these locations?

Response: As the code is currently written, an exit must come after exit access. An exterior exit access stair is not an exit, so the code seemingly still requires an exterior exit sign after an exterior exit access stair. Although this amendment does not address the unintentional consequence of a possible exterior exit sign, that consequence has been in the code since E7-12/13 was approved. In my professional experience, I have not seen this oversight as an issue.

NFPA 72 Section 17.15.9.4 states that, "Manual fire alarm boxes shall be located within 5 ft (1.5 m) of each exit doorway on each floor." Given that this is a not an exit doorway, a fire alarm box is not required.

This code change resolves a big issue. I have seen projects require major design change because an official has interpreted the a 2-story exterior stair as an exit, and the following path as an exit discharge egress court. This triggers exterior wall ratings and opening protectives that should not be required - in such an instance, the cheaper solution is to put up a roof so that the path can be interior and thus better understood as Exit Access.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Assuming a Type IIIA building utilizes this configuration, ICC estimates that the cost of constructing an unrated enclosure along the exit access path to be $177.77/sf.

Estimated Immediate Cost Impact Justification (methodology and variables):

Under the justification that this proposal is similar to E7 12/13, such that an equivalent interior space after an exit access stair would be permitted as unrated, this proposal saves the cost of that hypothetical construction.

Comment (CAH2)# 458

G7-24

IBC: SECTION 202; IFC: SECTION 202; IMC®: SECTION 202; IWUIC: SECTION 202

Proposed Change as Submitted

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com); Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Fire Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Mechanical Code

Revise as follows:

[BF] FLAME SPREAD INDEX. ~~The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723~~. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[BF] SMOKE-DEVELOPED INDEX. ~~A numerical value assigned to a material tested in accordance with ASTM E84.~~ A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

2024 International Wildland Urban Interface Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

Reason: Roberts (UL):

The revisions are as follows:

1) The purpose of the test is to determine the comparative burning characteristics of the material under test by evaluating the spread of flame over its surface and the density of the smoke developed when exposed to a test fire. These measurements are made as the test flame advances along the ceiling of the sample.

However, materials that melt and drip to the floor of the test chamber and continue burning, often have a second measurement reported, based upon the flame spread advancements of material burning along the floor of the furnace. For materials exhibiting these behaviors, both ceiling and floor measurements are reported for the flame spread, while ceiling and total smoke measurements are reported for the smoke developed.

The intent of the code requirement for these materials has been that when both the floor and ceiling measurements are reported, the ceiling measurement applies to the building code. This code change proposal clarifies that the ceiling measurement is applicable to avoid confusion when these two values are reported.

UL 723 contains specific direction in Section 7 (Classification) and Section 9 (Reporting) for the determination and reporting of ceiling and floor flame spread and ceiling and total smoke developed.

2) The International Mechanical Code (IMC) definitions are revised to match the IBC, IRC, IFC and IWUIC for consistency. Reference to UL 723 is the smoke-developed index is also added for consistency.

3) There is one other flame spread and smoke-developed index test standard besides ASTM E84 and UL 723. It is the CAN/ULC S102.2 test standard used for loose fill insulation, where the product is mounted and tested on the floor of the tunnel apparatus. Therefore, this test standard is listed as an exception in IBC Section 720.4 and IRC R302.10.

The clarification to the definitions regarding reporting of ASTM E84 and UL 723 values will not impact the reporting of CAN/ULC S102.2, which is currently limited to one product with one floor measurement.

Reason: Fischer (XPSA): While ASTM E84 and UL 723 contain the same requirements, there are a few minor differences in how data are captured and reported. This proposal will clarify how the test data from testing under either standard correlates to the FS and SD requirements in the code. It will also aid in code education efforts by improving the language.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This clarification reflects current practice and as such will neither increase or decrease the cost of construction.

G7-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee stated that the reason for approval was that the proposal clarifies how the test data from testing under ASTM E84 and UL 723 standards correlates to the FS and SD requirements in the code. The committee agreed with the clarification added to the definitions regarding reporting of ASTM E84 and UL 723 values. The committee concluded that the code

change proposal clarifies that the ceiling value is applicable to avoid confusion when ceiling and floor values are reported (Vote: 11-0).

G7-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IFC: SECTION 202; IMC®: SECTION 202; IWUIC: SECTION 202

Proponents: Richard Justin Koscher, Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*. Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

2024 International Fire Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*. Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

2024 International Mechanical Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*. Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

2024 International Wildland Urban Interface Code

Revise as follows:

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*. Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

Reason: PIMA is opposed to the proposed change that would use only the ceiling value for flame spread index when determining compliance with ASTM E84 and UL 723. However, the proposed change as approved by the Committee is misleading. The modified definition suggests that ceiling values for flame spread index are comparable for any material tested in accordance with ASTM E84 or UL 723. This is not true. As described in the scope of the ASTM E84 standard, ceiling values for materials that melt, drip, or delaminate during the test result in low flame spread indices and are not comparable to indices for materials that remain in place during the test. This public comment modifies the original proposal to include this clarification. The proposed clarification is verbatim from the ASTM E84 scope. While we oppose the proposed change, if approved by the Committee, the proposal should be clarified so that code officials and the public are not misled to believe that flame spread indices for all materials are comparable when only the ceiling values are used.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This public comment adds text to a definition and does not create any new requirements.

Comment (CAH2)# 622

Comment 2:

Proponents: Mike Fischer, Kellen, The Extruded Polystyrene Foam Association (mfischer@kellencompany.com); Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests As Submitted

Reason: FISCHER: XPSA agrees with the committee recommendation for Approval As Submitted.

UL 723 and ASTM E84 are test methods used to evaluate the spread of flame and development of smoke of combustible building materials when exposed to fire in a controlled environment (the Steiner Tunnel). While the I-Codes recognize both standards as equivalent, there are differences in how the test reports are prepared and what information is shared in a listing. Most notably, for materials such as thermoplastics that exhibit dripping material that continues to burn in the floor of the tunnel. UL 723 test reports contain additional information about the flame spread and smoke development characteristics of the materials at the bottom of the chamber.

The ASTM E84 Test Method does not contain a requirement to report the floor conditions; a ballot is underway at ASTM to mirror the UL 723 reporting provisions in E84. It is uncertain at this time what the outcome of that balloting will be, but XPSA supports the ASTM E84 modification that provides more information to end-users about the fire properties of XPS insulation materials on the floor of the tunnel test.

Materials producers that utilize UL 723 have test reports and listings containing both the tunnel ceiling values, (used to demonstrate code compliance for flame spread and smoke developed indices), as well as the floor values. The UL 723 listings with both floor and ceiling values have been in place for decades with the understanding the ceiling values govern code compliance. XPSA has brought this proposal forward to avoid potential compliance confusion about that reporting when the floor values are listed in both ASTM E84 and UL 723 listings.

What this proposal does:

Clarifies the current code requirements that have been in place and interpreted and enforced for decades

Simplifies compliance with a clear and consistent definition of *Flame Spread Index* and *Smoke-Developed Index* throughout the I-Codes

Removes the likelihood for marketplace confusion as to whether ceiling or floor values apply for code compliance

Provides additional information on floor values for designers, specifiers, and end-users in the interest of transparency

What this proposal does not do:

Weaken the fire safety provisions or test methods of the I-Codes; the ceiling numbers still apply

Change any code requirements; it adds UL 723 in the definition that is already in the body of the code

Relax any Flame Spread or Smoke Developed requirements in the I-Codes

Change foam plastic ignition resistance rating requirements in the IWUIC

Result in any changes to existing listing or code compliance reports, including those that already include reporting of floor values

Change (increase or decrease) any code compliance pathways for foam plastics

For example- consider a product that has UL 723 Ceiling FS/SD 15/165 values and floor values of 125/500. The IBC Section 2603.3 requires 75/450, thus the product currently complies using ceiling values. If floor values are required, product would not comply and this- and virtually ALL thermoplastics- would be completely eliminated from market. This interpretation would cause widespread disruption in the construction industry.

Summary: The XPS industry believes the I-Codes should provide additional clarity for code officials (and other users of the code) in order to help determine code compliance and how XPS materials perform to the fire safety requirements of the I-Codes.

HIRSCHLER:

ASTM E84 and UL 723 are fire tests that assess flame spread index and smoke developed index values for building materials and products. For most aspects of the fire test, both standards are virtually identical.

In the case of some materials, the test specimen will remain in its position on the ceiling of the test equipment (the Steiner tunnel) without melting, dripping, or otherwise interfering with the progression of the flame front over the test specimen both before the flame is applied during the test and throughout the test duration. Those test specimens are considered in the ASTM E84 standard as "self-supporting test specimens". In an ideal world, those are the only test specimens that should be required to be tested to ASTM E84 or UL 723.

However, the code often requires that some materials or products be tested to ASTM E84 or UL 723 to be acceptable for use. One such example are foam plastic insulation materials. Section 2603.3 of the IBC states as shown below and it requires all foam plastic insulation materials (unless used in a roof-covering assembly which has been tested to NFPA 276 or UL 1256) to be tested to ASTM E84. There often are (appropriately) additional fire safety requirements.

2603.3 Surface-burning characteristics. Unless otherwise indicated in this section, foam plastic insulation and foam plastic cores of manufactured assemblies shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723. Loose fill-type foam plastic insulation shall be tested as board stock for the flame spread and smoke-developed indices.

Exceptions:
1. Smoke-developed index for interior trim as provided for in Section 2604.2.
2. In cold storage buildings, ice plants, food plants, food processing rooms and similar areas, foam plastic insulation where tested in a thickness of 4 inches (102 mm) shall be permitted in a thickness up to 10 inches (254 mm) where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The approved automatic sprinkler system shall be provided in both the room and that part of the building in which the room is located.
3. Foam plastic insulation that is a part of a Class A, B or C roof-covering assembly provided that the assembly with the foam plastic insulation satisfactorily passes NFPA 276 or UL 1256. The smoke-developed index shall not be limited for roof applications.
4. Foam plastic insulation greater than 4 inches (102 mm) in thickness shall have a maximum flame spread index of 75 and a smoke-developed index of 450 where tested at a minimum thickness of 4 inches (102 mm), provided that the end use is approved in accordance with Section 2603.9 using the maximum thickness and density intended for use.
5. Flame spread and smoke-developed indices for foam plastic interior signs in covered and open mall buildings provided that the signs comply with Section 402.6.4.

The requirements shown above indicate that foam plastic insulation materials must be tested to ASTM E84 or UL 723 even if the materials do not generate self-supporting test specimens (for example by melting and dripping or otherwise falling to the test equipment floor during the test). The test standard requires that test specimens that are not self-supporting be held in place with metal supports but it cannot address what to do with test results when the materials have been properly supported during the test but they still melt or otherwise fall to the floor during the test. It may be argued that the test is inappropriate for materials that fall to the floor during the test (even if properly supported) but the code does not provide an alternate option.

For every test, UL 723 provides two sets of values: a set of values determined for tests during the period that the test flame progresses while the test specimen stays on the equipment ceiling (ceiling values) and a different set of values determined throughout the test for

tests where the test specimen falls to the tunnel floor at some time (floor values). ASTM E84 provides only a single set of values (ceiling values) but proposals exist to generate also floor values from ASTM E84.

The codes have required ASTM E84 (or UL 723) values for many years and the values used have always been the ceiling values, but that has not been explicitly stated. It is important that a code official who is presented with a test report that contains two sets of values understands which set of values needs to be used for regulation. That is what this proposal does: it continues what has always been done and helps a code official confronting two sets of values.

Note that testing of foam plastic materials that has been conducted with other fire tests has shown that those foam plastic materials that meet the ASTM E84/UL 723 flame spread index of 75 (as required in chapter 26 of the IBC) have better fire performance than those that do not.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 781

Comment 3:

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., North American Insulation Manufacturers Association (tcrimi@sympatico.ca); Laurie Hill, Rmax, a Business Unit of Sika Corporation (lhill@rmax.com); Edward Lisinski, American Wood Council, American Wood Council (elisinski@awc.org); Marcin Pazera, Polyisocyanurate Insulation Manufacturers Association, Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Jason Smart, American Wood Council (jsmart@awc.org) requests Disapproved

Reason: **CRIMI:** The justification submitted with this proposal is incomplete and can easily be misinterpreted. First, this proposal is in no way editorial in nature and creates a major conflict between products tested to ASTM E84 and those tested to UL 723.

The justification correctly states that:

> "The purpose of the test is to determine the comparative burning characteristics of the material under test by evaluating the spread of flame over its surface and the density of the smoke developed when exposed to a test fire."

In order for these tests to be able to provide comparative information, the tests need to be conducted in the same manner, for the same duration.

The calibration for ASTM E84 and UL 723 is based on a 10 minute fire exposure on a 24 foot long specimen of material. In order for the test to have any comparative ability, the ASTM E84 and UL 723 need to also be based on a 24 ft long specimen over a 10 minute duration. However, when "ceiling values" are reported in UL 723, the flame spread and smoke developed data are ignored beyond the point that the material is "believed" to no longer be burning on the ceiling. That also means that any remaining specimen beyond that point in time and distance is no longer measured, even if it reignites on the ceiling.

The fact that the floor values are reported in UL 723 is to enable the comparative data after the 10 minute test ends. The chart below includes some examples of the significant difference in both flame spread values, but more importantly the hazard from the smoke developed during the full test.

Numbers in RED indicate values above IBC Limits for Class A, B and C[1,2]

UL723			
UL or Intertek Listing	Calculation Method	Flame Spread Index (FSI)	Smoke Development Index (SDI)
BRYX.R5817	Floor and Ceiling XX&YY (same as E84)	175	500+
	Ceiling Only X&Y	25	40
BRYX.R8811	Floor and Ceiling XX&YY (same as E84)	110	500+
	Ceiling Only X&Y	10	175
BRYX.R3573	Floor and Ceiling XX&YY (same as E84)	140	500+
	Ceiling Only X&Y	20	50
SPEC ID: 37392	Floor and Ceiling XX&YY (same as E84)	100	1400
	Ceiling Only X&Y	25	450-
SPEC ID: 42922	Floor and Ceiling XX&YY (same as E84)	105	900
	Ceiling Only X&Y	25	450-
SPEC ID: 37391	Floor and Ceiling XX&YY (same as E84)	100	1400
	Ceiling Only X&Y	25	450-

There is also a statement that “These measurements are made as the test flame advances along the ceiling of the sample.” First, it seems this was intended to mean the surface of the sample mounted on the ceiling. Notwithstanding, this is only true in UL 723. ASTM E84 testing requires the flame spread and smoke developed ratings to be based on the maximum advance of the flame front and total smoke emitted after the 10 minute duration. Until now, the intent of the code requirements for all materials, (except for loose fill cellulose which uses CAN/ULC-S102.2) has been to mount specimens in the ceiling position, consistent with both ASTM E84 and UL723, but to report the flame spread and smoke developed values at the end of the 10 minute test, not somewhere in the middle.

HILL: As stated in the Preface of each code, I-Codes are “intended to establish provisions that adequately protect public health, safety and welfare; that do not unnecessarily increase construction costs; that do not restrict the use of new materials, products or methods of construction; and that do not give preferential treatment to particular types or classes of materials, products or methods of construction.” Approval of this code change gives preferential treatment to thermoplastic materials by allowing an unfair and misleading comparison of flame spread and smoke contribution potential. Disapproval of this code change proposal will not restrict the use of any materials.

The two primary objections to this proposal are lack of technical justification to substantiate the proposed change and the unintended consequences it introduces to code, specifically for plenums.

G7 lacks technical justification for the change:

- The definition that already exists in the IBC, IRC, IFC and IWUIC and is being proposed for the IMC includes that the indices are comparable. Adding language that differentiates materials and to what degree the results are to be used is contradictory to the concept of the indices being comparable. This applies not only to different building materials, but also the calibration standards for which the results were supposed to be based on.
- The first reason statement mentions that code intent has always been to use the ceiling values, yet there is no basis for where this comes from. Additionally, CAN/ULC-S102.2 is acknowledged for loose fill insulation, but there is no mention of CAN/ULC-S102.2 being used for materials that melt and drip. In fact, UL in Canada acknowledges that it is not appropriate to test materials on the ceiling of the tunnel when they require support or melt and drip and continue to burn on the floor of the test chamber during the test, specifically thermoplastic materials. Materials that remain in place are tested in the ceiling position (CAN/ULC-S102.1), while materials that don’t remain in place, i.e., thermoplastic materials, are tested in the floor position (CAN/ULC-S102.2). This doesn’t preclude materials from being used in buildings, it simply acknowledges that the materials are not comparable using the same test method.
- The second reason statement states that there are a few minor differences in how data are captured and reported between ASTM E84 and UL 723. I argue that the difference in how data is captured and reported between the two standards is far from minor when it comes to the materials that this code change proposal is aimed at. UL 723 results in a single Flame Spread Index (FSI) and Smoke-Developed Index (SDI) value for materials that remain in the ceiling position and 2 sets of values for materials that do not but rather melt and drip and continue to burn on the tunnel floor. For the latter group of materials, one set of values represents the ceiling only and is typically established during the first couple of minutes, while the second set, referred to as floor FSI and SDI, represents the entire 10-minute duration of test. Regardless of the material, ASTM E84 results in a single value, which includes burning of the material for the entire 10-minute duration of the test. There is no guidance in ASTM E84 on how to differentiate and calculate ceiling vs floor values, so anything other than a single FSI and SDI representing the entire fire performance is a

modification of the standard.

G7 may have unintended consequences:

- While this code change proposal suggests ignoring the contribution of burning on the tunnel floor is acceptable, one example of where it should certainly be a consideration is in plenums. Insulation requirements for use in plenum construction is an FSI of 25 or less and an SDI of 50 or less, often referred to as 25/50. Movement of flames and smoke through the ventilation system during a fire should be minimized, which leads to the very low FSI and SDI requirements in plenums. 13 of the 66 current UL product listings found for thermoplastic insulations met the low flame spread and smoke-developed index requirements of 25/50 when considering only the ceiling values, even though the total smoke contribution resulted in values well above that, including “over 500” for many of them. These are from 6 of 11 manufacturers' current listings found on UL’s Product IQ on-line directory. Two listings have been included for reference and confirmation of this unintended consequence.
- This code change proposal introduces a new standard in the definition for smoke-developed index. Currently, UL 723 is not defined as an acceptable standard when determining smoke-developed index in any of the I-Codes referenced. ASTM E84 produces a single, total contribution value and is currently the only defined standard for smoke-developed index. I do not believe there has been sufficient consideration of why UL 723, which introduces multiple values (ceiling only and total performance), wasn’t previously in the definition for smoke-developed index.

Thank you for your consideration.

See attached files: FMI EPS R18546.pdf; Dupont XPS R3573.pdf

LISINSKI/SMART: AWC requests reconsideration of the approval of the revision to the definitions of flame spread index (FSI) and smoke-developed index (SDI). ASTM E84 does not report ceiling and floor values, so the revision to the definition is not relevant to the ASTM E84 test and may cause conflicts in interpreting ASTM E84 test reports. The added sentence is already part of the provisions of the UL 723 standard, so it is unnecessary to add this statement in the code. If the requirements of UL 723 are modified in the future, the code could be in conflict with the standard. The added statement to the definition could also be viewed as adding code requirements into a definition.The difference between how test results are analyzed in ASTM E84 versus UL 723 can lead to a significant discrepancy in FSI and SDI values under these two standards. This in turn can lead to drastic differences in classification. Interior finish materials which drip or fall onto the floor during the test could be classified as Class C (or even unclassified) under ASTM E84 but could be classified as high as Class A under UL 723.The proposed revision to the definition of flame spread index could obscure actual FSI measurements, corresponding to maximum flame front travel recorded in accordance with ASTM E84 Section 8.3, by limiting the reported flame spread index to that which occurs only along the ceiling of the test apparatus.

Similarly, the proposed revision to the definition of smoke-developed index could obscure actual SDI measurements, corresponding to the total smoke development throughout the duration of the 10-minute test, by limiting the reported smoke-developed index to the smoke development measurements taken up to the time at which flaming begins on the floor of the test apparatus.

The proposed revision to the definitions of flame spread index and smoke-developed index would add a misleading new sentence to each of these definitions, using terminology that is inconsistent with terminology used in the ASTM E84 test standard. Section 8.3 of ASTM E84 requires that the distance of maximum flame front travel within the tunnel be observed and recorded as a function of time. Note that the word “distance” is singular, not plural. Under ASTM E84, there is only one measurement of the distance of maximum flame front travel recorded for each time at which an observation is to be made. The Commentary in Section X4.6.1.6 of ASTM E84 further clarifies that “the visual observation of flame travel is based on maximum flame extension anywhere within the tunnel volume, not necessarily directly on the specimen surface that may not be clearly visible.” Thus, regardless of whether the maximum flame front travel occurs near the ceiling of the tunnel, near the floor of the tunnel, or anywhere in between, ASTM E84 is clear: the value that is to be recorded is the distance of maximum flame front travel within the tunnel. While there is no prohibition on observing and recording other (lesser) values of flame front travel within the tunnel, ASTM E84 requires that FSI values be calculated using the maximum flame front travel.In addition to the concerns stated above, the scope of ASTM E84 (Section 1.1) states: "The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The material, product, or assembly shall be capable of being mounted in the test position during the test." (italics added to emphasize specific key words). If the specimen melts and drops onto the floor ahead of the flame front during the test, it should no longer be considered a valid ASTM E84 test. Furthermore, Section 1.5 of ASTM E84 cautions that "testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame

front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place." If the specimen melts and drops onto the floor ahead of the flame front, this would likely lead to the exact situation warned against in Section 1.5, wherein the continuity of the flame front on the specimen (which, according to 1.1 is required to be on the ceiling, facing down toward the ignition source) would be destroyed. The proposed revisions would therefore violate the scoping provisions of E84 Section 1 by implying that ASTM E84 makes a distinction between flame spread on the floor versus flame spread on the ceiling, thereby legitimizing flame-spread indices from tests that should be considered invalid under ASTM E84.

PAZERA: Fire safety is paramount to the design and construction of buildings and building systems. Building codes are fundamental to fire safety of buildings/structures and in that respect establish a framework that guides their construction and maintenance during service life. The International Code Council states that the International Building Code “is an essential tool to preserve public health and safety that provides safeguards from hazards associated with the built environment". Fire is one of the most significant hazards in the built environment and the propensity for materials to propagate flames and the associated smoke constitute important considerations when fire behavior of materials is considered and evaluated. The flame spread (FSI) and the smoke developed (SDI) indices are part of the I-Codes, however, the proposed revisions to the definitions in the IBC, IFC, IMC and IWUIC as outlined in the G7-24 are greatly concerning to PIMA for a number of reasons:

1. No technical justification.
2. Ceiling only values are not representative of the material being tested.
3. FSI and SDI are no longer comparable.
4. Unintended consequences in other applications.
5. Eliminates transparency.

No technical justification:

No technical justification has been presented. The only reason provided as indicated in the rationale of the proposed code change is a reference to the intent of the code. According to 2021 IBC Chapter 2603.3 commentary, “The maximum flame spread index value of 75 was chosen on the basis that it is lower than untreated wood (which usually is 100 to 165). The maximum smoke-developed index rating of 450 was selected because, at the time, the code permitted interior finish materials that gave off “smoke no more dense than that given off by untreated wood.”” The commentary makes no mention of using ceiling values only, and doing so would go against the notion of being “comparable” to untreated wood. Basing the FSI and SDI on ceiling values alone in I-codes is a flawed approach and technically unwarranted for materials that melt, drip and continue to propagate flames along the tunnel floor. Furthermore, this code change proposal undermines fire safety and is counterintuitive to fire engineering principles.

Ceiling only values are not representative of the material being tested:

Excluding the burning of material in the floor position of the tunnel, ignores a significant portion of how the material behaves resulting in a false perception of how the material performs. The more sensitive a material is to heat and flame, i.e., the faster the material melts/drips from the ceiling position, the lower the FSI and SDI ceiling values and better perceived fire classification. This approach results in materials shifting from a Class C in most cases to a Class A or even having an FSI as low as 0 (see **attached UL listing, R13184**, from UL's Product IQ on-line directory). UL listings typically show the total SDI as “over 500”, but the **attached Intertek Directory of Building Products listing (SPEC ID: 37392**) shows that SDI values can be as high as 1400.

FSI and SDI are no longer comparable:

ASTM E84 and UL 723 are designed to compare a material’s surface burning characteristics to that of a calibration material, such as fiber-cement board. Ceiling FSI and SDI values alone do not fully characterize fire behavior for materials that melt/drip to the tunnel floor. The ceiling FSI and SDI account for the initial and in many instances short portion of the 10 minutes test. Materials with low melting point tend to melt and drip/fall to the tunnel floor. The material on the tunnel floor continues to propagate flame for the duration of the test. The FSI and SDI criteria based on ceiling alone, ignores a large portion of the material’s fire performance, nullifies the comparison and goes against the intent of the ASTM E84 standard test method.

Unintended consequences in other applications:

Materials are used in applications other than ceilings, and there could be unintended consequences in other applications. Materials can be used in ceilings, floors, walls, roofs, plenums, etc. In certain applications, the contribution from material burning on the floor is indicative of what happens in real fire scenarios. Ignoring the burning on the floor and not acknowledging the connection between

various applications could have unintended consequences.

Eliminates marketplace transparency:

The proposed code change adds to the lack of transparency on the fire performance of certain types of materials. Manufacturers omit and do not report floor tunnel contribution for FSI and SDI. This information is limited to some listings and product labels where material has already been approved. This information is not presented on product data sheets and literature on which product approval decisions are most often based. Thus, products are approved without this critical information. When it comes to fire safety considerations related to behavior of certain types of materials that melt, drip and continue burning at the tunnel floor, we shall not rely on the non-transparent and least technically accurate evaluation approach.

Bibliography: CRIMI:

1. UL Product IQ, UL Category BRYX - Foamed Plastic, https://iq.ulprospector.com/en/profile?e=206774.
2. Intertek Building Products Directory, SPEC ID, https://bpdirectory.intertek.com/pages/DLP_Search.aspx

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Attached Files

- **Listing_SPEC ID-37392 (2).pdf**
  https://www.cdpaccess.com/comment/372/32270/files/download/8172/
- **Listing_R13184 2022-12 (1).pdf**
  https://www.cdpaccess.com/comment/372/32270/files/download/8171/
- **FMI EPS R18546 (1).pdf**
  https://www.cdpaccess.com/comment/372/32270/files/download/8170/
- **Dupont XPS R3573 (1).pdf**
  https://www.cdpaccess.com/comment/372/32270/files/download/8169/

Comment (CAH2)# 372

G8-24 Part I

IBC: SECTION 202; IFC: SECTION 202

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE.

PART II WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Revise as follows:

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of ~~the~~ a *exterior walls* of the *building* ~~under consideration~~, exclusive of ~~vent~~ *shafts* with no openings and *courts*, without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features. The floor area of a *building*~~, or portion thereof,~~ not provided with surrounding *exterior walls* shall be the occupiable space ~~usable area~~ under the horizontal projection of ~~the~~ a roof or floor above. ~~The *gross floor area* shall not include *shafts* with no openings or interior *courts*.~~

[BE] FLOOR AREA, NET. The ~~actual occupied area~~ occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, mechanical rooms and closets.

2024 International Fire Code

Revise as follows:

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of ~~the~~ a *exterior walls* of the *building* ~~under consideration~~, exclusive of ~~vent~~ *shafts* with no openings and *courts*, without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features. The floor area of a *building*~~, or portion thereof,~~ not provided with surrounding *exterior walls* shall be the occupiable space ~~usable area~~ under the horizontal projection of ~~the~~ a roof or floor above. ~~The *gross floor area* shall not include *shafts* with no openings or interior *courts*.~~

[BE] FLOOR AREA, NET. The ~~actual occupied area~~ occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, mechanical rooms and closets.

Reason: The changes clean up both definitions for readability and to remove redundancy. Additionally, it clarifies the use of “floor area” in IBC/IFC Table 1004.5 to point back to definitions.

The IMC includes the definition 'floor area, net', but does not use it in the text. They do include the definition of 'net occupiable floor area' which is used in Section 403.3.1.1.1.1 and footnote a in Table 403.3.1.1. We are proposing to delete this term since it is not used and is inconsistent with the IBC and IFC.

The IZC also includes definitions for 'floor area, net' and 'floor area, gross'. They are different from IBC and IFC and are not used in the text. There will be a code change in Group B to address this.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition,

there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial change to the definitions to provide additional clarity for application in determining occupant loads. This will not result in any changes to construction.

G8-24 Part I

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: This proposal was disapproved. For the definition of gross floor area there were questions if the phrase "with no openings" could exclude central light shaft with windows - now called "interior courts" in the current text. While "shafts with no openings" is current text, it is confusing about what this includes. In the 2nd sentence, 'occupiable space' should not be change to 'useable area' - this could exempt useable areas without walls, such as a pavilion. (Vote: 8-6)

G8-24 Part I

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IFC: SECTION 202

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of the ~~a~~ *exterior walls* of the *building*~~, exclusive of *shafts* with no openings and *courts*,~~ without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features and exclusive of interior courts. Where a space is ~~The floor area of a *building*~~ not provided with surrounding *exterior walls*, the floor area shall include the ~~be the occupiable space~~ useable area under the horizontal projection of a roof or floor above.

[BE] FLOOR AREA, NET. The occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, shafts, mechanical rooms and closets.

2024 International Fire Code

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of the ~~a~~ *exterior walls* of the *building*~~, exclusive of *shafts* with no openings and *courts*,~~ without deduction for *corridors*, *stairways*, *ramps*, closets, the thickness of interior walls, columns or other features and exclusive of interior courts. Where a space is ~~The floor area of a *building*~~ not provided with surrounding *exterior walls*, the floor area shall include the ~~be the occupiable space~~ useable area under the horizontal projection of a roof or floor above.

[BE] FLOOR AREA, NET. The occupiable space of a building, not including unoccupied accessory areas such as *corridors*, *stairways*, *ramps*, toilet rooms, shafts, mechanical rooms and closets.

Reason: The intent of the proposal remains to provide clarity with these defined terms. The revisions are to address the committee concerns.

There were questions about if shafts for elements such as mechanical, plumbing or elevators should be included. This is within gross floor area, but has been added as excluded in net floor area. Gross floor areas would not include central courts, such as in an O or U shaped buildings, but would include areas that are under roofs, such as outdoor dining areas at a restaurant. This is important for determination of occupant loads.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial change to the definitions to provide additional clarity for application in determining occupant loads. This will not result in any changes to construction.

Comment (CAH2)# 129

NOTE: G8-24 PART II DID NOT RECEIVE A COMMENT (CAH2) AND IS REPRODUCED FOR INFORMATIONAL PURPOSES ONLY

G8-24 Part II

IMC®: SECTION 202

Proposed Change as Submitted

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Mechanical Code

Delete without substitution:

~~**FLOOR AREA, NET.** The actual occupied area, not including unoccupied accessory areas or thicknesses of walls.~~

Reason: The changes clean up both definitions for readability and to remove redundancy. Additionally, it clarifies the use of “floor area” in IBC/IFC Table 1004.5 to point back to definitions.

The IMC includes the definition 'floor area, net', but does not use it in the text. They do include the definition of 'net occupiable floor area' which is used in Section 403.3.1.1.1.1 and footnote a in Table 403.3.1.1. We are proposing to delete this term since it is not used and is inconsistent with the IBC and IFC.

The IZC also includes definitions for 'floor area, net' and 'floor area, gross'. They are different from IBC and IFC and are not used in the text. There will be a code change in Group B to address this.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an editorial change to the definitions to provide additional clarity for application in determining occupant loads. This will not result in any changes to construction.

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The committee voted 14-0 to accept the proposal as submitted. The argument presented made sense in light of the proponent's justification. Although it is not used in the text, the definition of "floor area, net" is included in the IMC.

G9-24

IBC: SECTION 202; IFC: SECTION 202; IPMC: SECTION 202

Proposed Change as Submitted

Proponents: Jennifer Goupil, Structural Engineering Institute of ASCE, American Society of Civil Engineers (jgoupil@asce.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BE] GUARD. A *building* component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

2024 International Fire Code

Revise as follows:

[BE] GUARD. A *building* component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

2024 International Property Maintenance Code

Revise as follows:

[BE] GUARD. A *building* component or ~~a system of *building*~~ assembly of components located at or near the open sides of an elevated walking surface ~~surfaces~~ that minimizes the possibility of a fall from the elevated walking surface ~~to a lower level~~.

Reason: This proposal is a coordination proposal to improve the alignment between the provisions in the International Codes with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). The Dead and Live Load Subcommittee of ASCE 7 has been working for several cycles to align the requirements in these documents related to Dead and Live Loads.

The proposed changes to the definition of the word Guard are intended to remove unnecessary and potentially confusing words, as well as to improve the coordination between the definitions in the International Codes and in ASCE 7.

The word "building" is struck in two places as it is unnecessary and does not appear in the ASCE 7 definition. The definition is clear without it. Additionally, the use of the word “building” could cause confusion as the scope of the IBC includes buildings and structures per Section 101.2, but the word “structures” does not appear alongside the word “building”.

The word "system" is changed to "assembly" to match the ASCE 7 definition. The words in this usage are interchangeable. However, in ASCE 7 the defined term is Guard System, and as such the ASCE 7 definition uses “assembly” to avoid using “system” in both the defined term and in the definition. It is generally considered not good practice to repeat words being defined in the definition itself.

The addition of the word "elevated" and the removal of the phrase "to a lower level" matches ASCE 7 text and uses less words to accomplish the same meaning. There is no need to define where you are falling to once it is established that the guard is on the elevated surface.

Note, this definition appears in the following I-codes and the intent is to have the proposal revise the definition in each code; IBC, IRC, IFC, and IPMC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease costs related to guards as the proposal does not in any way revise the code requirements for guards. The proposal is an editorial code change which aligns specific words in the ICC definition with specific words in the ASCE 7 definition.

G9-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: The change in the wording in was approved. It is appropriate to apply guard requirements to structures as well as buildings. This would also coordinate with ASCE 7 definitions. (Vote: 13-1)

G9-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IFC: SECTION 202; IPMC: SECTION 202

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

[BE] GUARD. A component or assembly of components located at or near the open sides of an elevated walking surface that minimizes the possibility of a fall from the elevated walking surface to the floor or grade below

.

2024 International Fire Code

[BE] GUARD. A component or assembly of components located at or near the open sides of an elevated walking surface that minimizes the possibility of a fall from the elevated walking surface to the floor or grade below

.

2024 International Property Maintenance Code

[BE] GUARD. A component or assembly of components located at or near the open sides of an elevated walking surface that minimizes the possibility of a fall from the elevated walking surface to the floor or grade below

.

Reason: The current action taken by the committee deletes "to a lower level" from the definition for guard. Deletion of this essential text without substitution renders the definition to be indefinite. Whereas the modification suggested here makes a suitable substitution that actually improves the definition. In the two leading sections of 1015 Guards, the ***floor, grade, finished grade*****,** or ***other surface*** are specifically mentioned to determine the distance of a fall to a level ***below***.

1015.1 General.*Guards* shall comply with the provisions of Sections 1015.2 through 1015.7. Operable windows with sills

located more than 72 inches (1829 mm) above ***finished grade or other surface below*** shall comply with Section 1015.8.

1015.2 Where required.*Guards* shall be located along open-sided walking surfaces, such as *mezzanines*, *equipment platforms*, *aisles*, *stairs*, *ramps* and landings, that are located more than 30 inches (762 mm) measured vertically to the ***floor or grade below*** at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of occupiable roofs. *Guards* shall be adequate in strength and attachment in accordance with Section 1607.9. ***<emphasis added>***

This in the same modification submitted by the Structural Engineering Institute of ASCE heard as Graveen MP1 during CAH#1.

The use of "floor or grade below" from **1015.2 Where required** in the definition provides strict correlation with the IBC requirements and clearly identifies that the fall is to a lower elevation in terms clearly understood by users of the code as well as users of ASCE 7. Guards are required "along open-sided walking surfaces" to minimize a fall but not a fall to the walking surface where the guard is located. To delete "to a lower level" and only indicate "fall from" fails to serve as a complete definition and allows a potential misinterpretation that guards can minimize falls from the walking surface, on to the same walking surface, into furniture or even into the guard itself which is a fall that is impossible for the guard to minimize. Guards by design are not handrails or ambulatory aids but rather they establish both physical and visual boundaries with their placement. Guards serve to minimize the possibility of a fall to the opposite side of the guard located at an extreme elevation change. The lack of some indication of where the fall is "to" is indefinite and will inevitably offer a feast to litigators servubg no purpose related to building safety with any concern for cost.

This modification was developed through the collaboration of the ASCE 7 Live and Dead Loads Committee and the SMA, Stairbuilders and Manufacturers Association - Code and Research Committee. This code change effectively correlates the definition in ASCE 7 and IBC as supported by CAH#1 testimony for approval by both ASCE and SMA. In light of this collaborative effort the committees thoughtful reconsideration would seem prudent.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will not increase or decrease costs related to guards as the proposal does not in any way revise the code requirements for guards. The proposal is an editorial code change which aligns specific words in the ICC definition with specific words in the ASCE 7 definition.

Comment (CAH2)# 218

G11-24

IBC: SECTION 202; IFC: SECTION 202

Proposed Change as Submitted

Proponents: John Poole, Poole Fire Protection, Inc., ASI Southeast (jpoole@poolefire.com); Matthew Stepp, ASI Southeast Inc, ASI Southeast Inc (mstepp@asi-southeast.com); Dale Wheeler, Systech Fire Protection LLC, Scranton Products (sgidw@aol.com)

THIS CODE CHANGE WILL BE HEARD BY THE IBC FIRE SAFETY COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of *buildings*, including but not limited to: fixed or movable walls and partitions~~; toilet room privacy partitions;~~ columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

2024 International Fire Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions~~; toilet room privacy partitions;~~ columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural *fire resistance* or similar purposes, but not including trim.

Reason: POOLE: Toilet partitions are primarily made from stainless steel, powder coated galvanneal, plastic laminate (particleboard with high pressure laminate facing and edging), phenolic, and high-density polyethylene (HDPE). As a result of changes made to the definition of “Interior Wall and Ceiling Finish” in 2006, toilet room privacy partitions have been defined as an interior wall partition, which subjects it to various flammability test methods to be considered compliant. Based on the extensive history in manufacturing and selling toilet partitions, along with many hours of researching fires from the National Fire Incident Reporting System (NFIRS) data and the National Fire Protection Association (NFPA) One-Stop Data Shop, that occur in a public restroom, we have yet identified a scenario where toilet room privacy partitions, made from any of these materials, was the primary source or contributing fuel for a fire, which was responsible for the loss of life or significant property damage/loss.

The current flammability testing methods are unnecessary and add significant manufacturing and other related costs. Since the changes in the 2009 IBC, Section 803.12, manufacturers of HDPE toilet room privacy partitions have been subjected to a different set of flammability testing standards than all of materials that are commercially used for producing toilet partitions without any supporting historical fire loss data to justify these increased flammability testing measures. For HDPE toilet room privacy partitions to be compliant with IBC regulations and pass the NFPA 286 room corner test, manufacturers have had to consider many reformulations, which in turn increases the cost of this product with no historical fire loss data to justify these increased costs. Each reformulation subjects the manufacturer to increase the overall cost of the product to the consumer. Additional costs come from many different aspects of the product development life cycle including additives to improve the overall performance of the product due to these testing parameters that increases the cost of the product by up to 100%, or selecting a different additive that does not increase the cost but is a known carcinogen. A manufacturer must consider all the additional expenses that will be incurred throughout the entire product process including, but not limited to: an increase in weight of the product by up to 30% which in turn increases freight costs; the repairs and maintenance of the manufacturing equipment in order to produce products due to additives; ensuring employee safety when handling the heavier material; revisions to packaging to manage the additional weight and ensure quality of product; increase in the cost of other raw materials to ensure the quality of the product; revisions to hardware components necessary to install the partitions to ensure product life cycle performance due to the additional weight; the cost of the product outside of the manufacturing facility such as freight to the construction site; additional labor costs required for installation of heavier components to ensure employee safety; reduction of product life expectancy and therefore increased replacement costs due to the introduction of additives that reduces the durability of HDPE and the replacement components. All of these above items increase the cost to the end consumer solely for the benefit of being compliant to

a regulation that is not justified based upon loss of life and property fire loss data.

In addition to the significant costs imposed on toilet room privacy partition manufacturers, none of the fire test standards required by the IBC are specific to the external fuel loading or how toilet room privacy partitions are used and installed. In terms of fire risks in public restrooms, the main ignitable materials in public restrooms are paper products such as toilet paper and/or paper hand towels. Although difficult to ignite, disinfectant and hand soap containers could also be considered ignitable fuels within public restrooms. In terms of these materials, toilet paper dispensers are generally affixed to a toilet room privacy partition to allow easy occupant access. Currently, there is no requirement for the toilet paper dispensers or other devices affixed to a toilet room privacy partition to adhere to interior wall finish requirements. The vast majority of public restrooms contain few, if any, potential ignition sources. Therefore, based on the low propensity for fire ignition, coupled with the low fuel loading within these spaces, the risks of a substantial fire occurring are nearly non-existent. And this is supported by the lack of fire data that reflects the toilet room privacy partitions were the primary source or contributing fuel source of a fire, which was responsible for the loss of life or significant property damage/loss.

HDPE toilet room privacy partitions are exclusively installed in restrooms and HDPE partitions installed in other areas cannot, by definition, be classified as toilet room privacy partitions. As discussed previously, having a fire in a restroom capable of igniting an HDPE toilet room privacy partition is not expected, especially if the restroom is provided with automatic sprinkler protection. When the toilet stall is occupied, it can be expected that the occupant will be in very close proximity to the partitions, providing for very early warning of an incipient stage fire. While it can be expected that a restroom occupant will require more pre-movement time than an occupant of other spaces, this time disparity is offset with the earlier warning. Also, due to general architectural design philosophies, restrooms are separated from most normally occupied spaces to provide their occupants with increased privacy. Therefore, in the case of a restroom fire, once outside of the restroom and in the publicly occupiable disorder, the occupant would be shielded from the restroom fire by the room's walls and door. Therefore, the smoke indices and the peak heat release rates from an HDPE toilet room privacy partition are largely irrelevant in terms of protecting a restroom occupant from a fire, even if one were to be ignited in a public restroom.

For these reasons, it can be expected that the life safety of both restroom occupants, and those within the adjacent publicly occupiable spaces will be at risk from a restroom fire from any toilet partition. Therefore, requiring toilet room privacy partitions, including those constructed of HDPE, to be fire rated to meet interior finish requirements, poses an undue burden on the toilet room privacy partition industry and the consumers, and provides no added benefit, since a restroom fire problem does not exist. For the above-described rationale, "toilet room privacy partitions" should be removed from the "interior wall and ceiling finish" definition in Section 202 of the IBC and IFC.

WHEELER:

Purpose: This code change would remove toilet room privacy partitions from the definition of Interior Wall and Ceiling Finish.

Reasons: Toilet room privacy partitions are not properly characterized as interior finish and should not be subject to interior finish requirements.

Substantiation: In IBC editions 2003 and prior, toilet room privacy partitions were not indicated to be interior wall and ceiling finish. The 2006 edition of the IBC included the current code language. However, no convincing technical substantiation was provided to support that change. Further, toilet room privacy partitions are not similar to typical interior finishes, such as wall coverings, floor coverings, or decorative items. Toilet room privacy partitions are not directly adhered to walls of ceilings as are typical interior finishes. Also, toilet room partitions are installed perpendicular to walls, and therefore are not subject to the same corner-exposure as other wall finishes. Corner configurations of traditional wall coverings are known to produce taller flames due to the reduced air entrainment, compared to a fire in the open or along a single wall, but that is not the case with toilet room partitions. Toilet room privacy partitions also differ from fixed or movable walls with regard to environment and exposure within a building. Typical sources of fire ignition found in areas other than toilet rooms do not exist in proximity to toilet room privacy partitions.

The bulk of ordinary combustibles in a toilet room are not typically near the toilet room privacy partitions. So, for example, a fire starting in a waste can, is not expected to be near to or impact toilet room partitions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

POOLE: Building owners and those responsible for sourcing toilet room privacy partitions, specifically HDPE partitions, will initially see somewhat reduced costs from $0 and less, which would vary based on the costs identified in the reason statement.

WHEELER: The proposed code change will reduce the cost of construction by removing requirements that are not properly applicable.

Estimated Immediate Cost Impact Justification (methodology and variables):

POOLE: It is anticipated that as additional products from additional manufacturers are able to enter the marked, costs will be reduced. These manufacturers will incur lower initial costs, as they will not be required to pay for materials additives and fire tests that may not represent the real-world conditions in which these materials are installed and utilized.

WHEELER:

Logical Analysis.

G11-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved the proposal due to safety concerns. The committee did not agree to remove the "toilet room privacy partitions" from the "Interior Wall and Ceiling Finish" definition. The committee indicated that toilet room privacy partitions could increase the fire load in a building that has a lot of people (Vote: 12-0).

G11-24

Individual Consideration Agenda

Comment 1:

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests Disapproved

Reason: I attach an image of a set of plastic toilet partitions and an image of a set of plastic lockers. They look pretty similar.

Combustible lockers are regulated as interior finish by section 806.8 that reads as shown below. There is no reason to consider treating combustible toilet partitions in a different way than combustible lockers.

806.8 Combustible lockers. Where lockers constructed of combustible materials are used, the lockers shall be considered to be interior finish and shall comply with Section 803.
Exception: Lockers constructed entirely of wood and noncombustible materials shall be permitted to be used wherever interior finish materials are required to meet a Class C classification in accordance with Section 803.1.2.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 428

Comment 2:

IBC: SECTION 202, SECTION 202 (New), 803.1.3, 803.14 (New); IFC: SECTION 202, SECTION 202 (New), 803.1.3, 803.16 (New)

Proponents: Dale Wheeler, Systech Fire Protection LLC, Scranton Products (dale.wheeler@systechfire.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed *interior surfaces* of *buildings*, including but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including *trim*.

Add new definition as follows:

TOILET ROOM PRIVACY PARTITIONS.. The exposed interior surfaces of partitions used to provide privacy between toilet room stalls.

Revise as follows:

803.1.3 Interior wall and ceiling finish materials with different requirements. The materials indicated in Sections 803.2 through ~~803.13~~ 803.14 shall be tested as indicated in the corresponding sections.

Add new text as follows:

803.14 Toilet room privacy partitions. Toilet room privacy partitions shall be treated as interior finish and regulated under Section 803.1.2 regardless of materials used for the toilet room partition.

2024 International Fire Code

Revise as follows:

[BF] INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural *fire resistance* or similar purposes, but not including trim.

Add new definition as follows:

TOILET ROOM PRIVACY PARTITIONS. The exposed interior surfaces of partitions used to provide privacy between toilet room stalls.

Revise as follows:

803.1.3 Interior wall and ceiling finish materials with specific requirements. The materials indicated in Sections 803.4 through ~~803.15~~ 803.16 shall be tested as indicated in the corresponding sections.

Add new text as follows:

803.16 Toilet room privacy partitions. Toilet room privacy partitions shall be treated as interior finish and regulated under Section 803.1.2 regardless of materials used for the toilet room partition.

Reason: During CAH#1, several members voiced their concern that this code change proposal would leave toilet partitions unregulated. To be clear, Scranton Products does not wish to leave toilet partitions unregulated. The current code, however, must be changed for three main reasons: (1) the original code change including toilet partitions in the definition of interior finish was made with no technical substantiation; (2) the original code change, as well as the later code changes subjecting HDPE toilet partitions to NFPA 286, have been driven and influenced by Bobrick, a toilet partition manufacturer that does not manufacture or sell HDPE partitions; and (3) the current code has produced anticompetitive results in favor of Bobrick—who misrepresents the fire rating of their own partitions—and does not increase universal fire safety for the toilet partition industry. For these reasons, this Committee should approve this code change.

1. No Technical Substantiation Prior to 2003, the IBC did not specify toilet room privacy partitions as interior wall and ceiling finish. Starting with the 2006 edition of the IBC, the IBC began classifying toilet partitions as interior finish. Even so, no convincing technical substantiation was provided to support that change. Further, toilet room privacy partitions are not similar to typical interior finishes, such

as wall coverings, floor coverings, or decorative items. Toilet room privacy partitions are not directly adhered to walls of ceilings as are typical interior finishes. Also, toilet room partitions are installed perpendicular to walls, and are thus not subject to the same corner-exposure as other wall finishes. Corner configurations of traditional wall coverings are known to produce taller flames due to the reduced air entrainment, compared to a fire in the open or along a single wall, but that is not the case with toilet room partitions. Toilet room privacy partitions also differ from fixed or movable walls based on their environment and exposure within a building. Typical sources of fire ignition found in areas other than toilet rooms do not exist in proximity to toilet room privacy partitions.The bulk of ordinary combustibles in a toilet room are also not typically near the toilet room privacy partitions. So, for example, one would not expect a fire starting in a waste basket to be near to or impact toilet room partitions because those waste baskets are typically at or near the exit door or embedded in the sink. For these reasons, classifying toilet partitions as interior finish lacks technical support.

2. Bobrick Influenced These Code Changes The lack of technical substantiation to support the original code change including toilet partitions in the definition of interior finish has become more problematic because it has resulted in creating an unfair competitive advantage for non-HDPE partition manufacturers. The current application of NFPA 286 based on the discriminatory definition of interior finish—where particular bathroom partitions are exempt based on material—creates an unfair situation. As this Committee is aware, the change in the 2006 edition of the IBC—which includes toilet partition in the definition of interior finish—was proposed by a representative of Bobrick. Bobrick's involvement in driving these code changes was especially peculiar because Bobrick manufactures phenolic and laminate partitions, neither of which can pass NFPA 286. In other words, Bobrick was pushing fire safety measures on other types of toilet partitions, but not on their own toilet partitions. On top of this, in 2015, Marcelo Hirschler proposed another code change to Chapter 8 of the IBC. In FS-139-15, Mr. Hirschler stated that this code change proposal "reorganizes section 803 to make it follow the testing logic, but it does not change any of the requirements." Mr. Hirschler has testified in litigation involving Bobrick that he is "friends" with two of Bobrick's consultants, has discussed these code changes with at least one of Bobrick's consultants, but denies implementing the changes on behalf of Bobrick. Mr. Hirschler also stated that "any interior wall and ceiling finish material is permitted to be tested to NFPA 286," and he reaffirmed that "[t]extile and expanded vinyl ceiling coverings stay as is, just with the section reference changed. The same is true for HDPE and PP." Despite these statements about the "reason" for this proposed code change, Mr. Hirschler's proposed code change removed the word "permitted" from Section 803.1.2. Said differently, Chapter 8 of the IBC previously permitted HDPE to comply with NFPA 286, but Mr. Hirschler's proposed code change mandated that HDPE comply with NFPA 286. Scranton Products deposed Mr. Hirschler in a litigation involving Bobrick and Scranton Products, and he testified under oath that this code change proposal was not meant to change any requirements in this code, and it was purely an editorial or organizational change. He could not, however, provide a plausible reason for removing the word "permitted" from Section 803.1.2. He also confirmed that he did not make this proposal on behalf of a client or for any other reason other than he decided it was necessary. The ICC ultimately adopted this code change proposal and implemented it into the 2018 version of the IBC. The practical impact of Mr. Hirschler's code change is that HDPE toilet partitions now must comply with NFPA 286, but non-HDPE toilet partitions need only comply with ASTM E84. Said differently, Scranton Products and other HDPE toilet partition manufacturers are expected to meet a more demanding and more expensive fire rating test than their competitors that do not manufacture HDPE toilet partitions, such as Bobrick. Although Mr. Hirschler claims he is independent and does not work as a Bobrick consultant, Mr. Hirschler's continued involvement with these code changes benefiting Bobrick and harming its competitors is particularly troubling, especially given his positions within the NFPA and ICC. Mr. Hirschler's involvement in creating this new requirement is particularly relevant here because he, along with two other Bobrick representatives (Bill Koffel and Jim Lathrop), were the only individuals that publicly opposed this code change proposal at CAH#1.

3. Anticompetitive Results Without Universal Fire Safety Bobrick's misuse of fire safety standards for commercial reasons has resulted in unfair and anti-competitive playing field across the bathroom partition industry. Specifically, Bobrick is holding Scranton Products' NFPA 286 compliant partitions to a standard Bobrick's partitions cannot meet. In ongoing litigation brought by Bobrick, it is arguing Scranton Products should not be allowed to sell their non-NFPA 286-compliant HDPE partitions. At the same time, Bobrick is misrepresenting the fire rating for their own partitions. A universal standard for the toilet partition is necessary to extinguish this uneven playing field established by Bobrick. First, Bobrick is holding Scranton Products' NFPA 286 compliant partitions to a standard Bobrick's partitions cannot meet. Scranton Products commissioned Intertek, an independent fire testing lab, to conduct testing on Bobrick's partitions. Intertek conducted NFPA 286 testing of Bobrick's Duraline Series 1080 Compact Grade Laminate partition ("1080 Partition") and Bobrick's Class Series 1540 High Pressure Laminate partition ("1540 Partition").

Bobrick's 1080 Partition failed the NFPA 286 test, and Bobrick's 1540 Partition notably failed the NFPA 286 test in under 2.5 minutes. Scranton Products manufactures an HDPE partition that passes NFPA 286. If fire safety is the most important concern of this committee, all toilet partitions should comply with NFPA 286. Holding particular toilet partitions to a higher standard (i.e., Scranton

Products) while allowing other toilet partitions to miserably fail the same fire test (i.e., Bobrick) does not support fire safety, but fosters an uneven playing field. Second, Bobrick has made their intentions clear—in litigation, Bobrick is taking the position that Scranton Products cannot sell their non-NFPA 286-compliant HDPE partitions that meet ASTM E84. Bobrick makes this argument even though Scranton Products has explained to Bobrick that pre-2018 versions of the IBC do not mandate that HDPE comply with NFPA 286. In any event, Scranton Products has certified tests from Intertek revealing that these non-NFPA 286 HDPE partitions meet ASTM E84, Class B, which is compliant in jurisdictions that have implemented pre-2018 versions of the IBC .Last, Bobrick argues that Scranton Products should not sell non-NFPA 286 HDPE partitions, but at the same time, Bobrick is misrepresenting the fire rating for their own competing partitions. As noted, Scranton Products commissioned Intertek to conduct fire testing of Bobrick's partitions.

Intertek's independent testing revealed in six tests that Bobrick's 1540 Partitions only achieve a Class C rating, not a Class B rating, as claimed by Bobrick. Even if Bobrick's 1540 Partitions are code compliant because they meet ASTM E84 Class C, Bobrick's misrepresentation of the fire rating for their 1540 Partitions casts doubt on their true motive in pushing fire safety measures on its competitors, while not subjecting their own partitions to the same standards. This Council should either remove bathroom partitions from the definition of interior finish or it should make this standard apply to all bathroom partitions, not just some bathroom partitions. Taking this step would also create clarity and consistency in the industry, including for architects, designers, and builders who are ultimately responsible for interpreting these codes. At CAH #1, the Committee raised an objection with respect to the original code change proposal indicating that acceptance of that code change proposal would have left toilet room partitions unregulated. If this committee is apprehensive to removing toilet partitions from the definition, the undersigned submits the following modified proposal that achieves the goal of creating a universal standard for all toilet partitions. This modified proposal addresses that concern by providing that toilet room partitions would be subject to testing in accordance with ASTM E84 or UL 723. This change would have the added benefit of leveling the field in that all toilet room partitions would then be subject to the same testing criteria.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 659

G12-24 Part I

IBC: SECTION 202 (New)

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

THIS IS A 5 PART CODE CHANGE.

PART I WILL BE HEARD BY THE IBC-FIRE SAFETY COMMITTEE.

PART II AND V WILL BE HEARD BY THE FIRE CODE COMMITTEE.

PART III AND IV WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE.

SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Building Code

Add new definition as follows:

NONCOMBUSTIBLE MATERIAL. A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the IBC are considered noncombustible materials.

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136. **Exception:** Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The proposal was disapproved as requested by the proponent to work on the proposal for the CAH2 (Vote: 11-0).

G12-24 Part I

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202; IEBC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Revise as follows:

NONCOMBUSTIBLE MATERIAL.
See Section 703.3.
~~A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the IBC are considered noncombustible materials~~

2024 International Existing Building Code

[BF] NONCOMBUSTIBLE MATERIAL. ~~A material that, under the conditions anticipated, will not ignite or burn when subjected to fire or heat. Materials that pass ASTM E136 are considered noncombustible materials.~~ See Section 703.3 of the International Building Code.

Reason: During CAH1, this proposal was requested to be disapproved to have an opportunity to work with stakeholders to address concerns expressed.
Working with many stakeholders to revise language, we feel this proposal addresses those prior expressions.

The term “noncombustible material” is used in this code in many different chapters, and also throughout the other i-codes. In other codes, this term is inconsistently defined, or not defined at all, leading users of other codes to the IBC for guidance, but this is not defined in IBC resulting in confusion amongst users.

IBC Section 703.3 provides information on what qualifies a material to be noncombustible in context of the i-codes.

This proposal G12-24, in all its parts, guides users of this, and other i-codes which reference the IBC, to where this information can be found.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is clarifying in nature and will not result in cost impacts. It does not add or remove any requirements. It is clarifying to a user where to find the performance requirements.

Comment (CAH2)# 368

G12-24 Part II

IFC: SECTION 202 (New)

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Fire Code

Add new definition as follows:

NONCOMBUSTIBLE MATERIAL. A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

G12-24 Part II

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The definition is not needed. Noncombustible is used throughout the code. There are performance requirements in the IBC. It is going to further confuse the issue about noncombustible material. (Vote: 14-0)

G12-24 Part II

Individual Consideration Agenda

Comment 1:

IFC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products

(alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fire Code

Delete and substitute as follows:

~~**NONCOMBUSTIBLE MATERIAL.** A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.~~
NONCOMBUSTIBLE MATERIAL. See Section 703.3 of the *International Building Code.*

Reason: Prior language suggested in the original proposal raised concerns from stakeholders, leading to a floor modification. During CAH1, additional concerns were expressed and this attempts to address those concerns as well.

The term “noncombustible material” is used many times within this code but does not have a definition, Section 201.3 of this code outlines that definitions not contained within this code shall comply with terms defined in IBC, IFGC, IMC, or IPC.

The *International Building Code* does have criteria outlining what qualifies a material as noncombustible in context of code as was noted during the first hearing. “Noncombustible material” however is not *defined* within IBC or IPC, so performance requirements within IBC section 703.3 cannot be used in this code per IFC 201.3.

IFGC and IMC currently do contain definitions for “noncombustible material”; but both incorrectly mandate requirements within a definition and neither definition matches that of the IBC requirements in 703.3 which includes the additional test method ASTM E2652 using ASTM E136 acceptance criteria, and also makes exception for materials using surfacing not more than 0.125 inch with flame spread index less than 50.

This proposal, and the other parts of G12-24 (which similarly address definitions within IFGC and IMC), seeks to resolve inconsistencies throughout codes while providing guidance to users what is required to qualify as “noncombustible material” within the context of the i-codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is clarifying in nature and will not result in cost impacts. It does not add or remove any requirements. It is clarifying to a user where to find the performance requirements.

Comment (CAH2)# 737

G12-24 Part III

IFGC: SECTION 202

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Fuel Gas Code

Revise as follows:

[M] NONCOMBUSTIBLE MATERIALS. ~~Materials that, where tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~
A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54°F (30°C) above the furnace temperature at the beginning of the test.~~

2. ~~There shall not be flaming from the specimen after the first 30 seconds.~~

3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

G12-24 Part III

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of the proposal. The proposal's proponent asked for the proposal to be disapproved to have an opportunity to work together with stakeholders to bring back a better proposal to CAH2.

Individual Consideration Agenda

Comment 1:

IFGC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Fuel Gas Code

Delete and substitute as follows:

~~**[M] NONCOMBUSTIBLE MATERIALS.**~~
~~A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.~~

[M] NONCOMBUSTIBLE MATERIALS. See Section 703.3 of the I*nternational Building Code.*

Reason: During CAH1, this proposal was requested to be disapproved to have an opportunity to work with stakeholders to address concerns expressed.
Working with many stakeholders to revise language, we feel this proposal addresses those prior expressions.

The term “noncombustible material” is used many times within this code, is not consistently defined relative to other i-codes, and improperly includes requirements within a definition.

To address this, proposal G12-24 parts I-IV, seeks to address these issues by unifying to those of the requirements of International Building Code Section 703.3.The International Building Code has criteria outlining what qualifies a material as noncombustible within the context of code, “noncombustible material” however is not defined within IBC, so performance requirements within IBC section 703.3 cannot be used in this code per IFGC 201.3.

While IFGC and IMC currently do contain definitions for “noncombustible material”; both incorrectly mandate requirements within a definition and neither definition matches that of each other or of the IBC requirements in 703.3, which includes an additional test method ASTM E2652 and also makes exception for materials using surfacing not more than 0.125 inch with flame spread index less than 50.

This proposal is not defining requirements , it will simply guide users to what qualifies a material as noncombustible in context of the i-codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It does not add or remove any requirements. It is clarifying to a user where to find the performance requirements.

Comment (CAH2)# 742

G12-24 Part IV

IMC®: SECTION 202

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Mechanical Code

Revise as follows:

NONCOMBUSTIBLE MATERIAL. ~~A material that passes ASTM E136.~~ A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

G12-24 Part IV

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee voted 14-0 to disapprove of the proposal. The proposal's proponent asked for the proposal to be disapproved to have an opportunity to work together with stakeholders to bring back a better proposal to CAH2.

G12-24 Part IV

Individual Consideration Agenda

Comment 1:

IMC®: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Mechanical Code

Delete and substitute as follows:

~~**NONCOMBUSTIBLE MATERIAL.** A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the International Building Code are considered noncombustible materials.~~
NONCOMBUSTIBLE MATERIAL. See Section 703.3 of the *International Building Code.*

Reason: During CAH1, this proposal was requested to be disapproved to have an opportunity to work with stakeholders to address concerns expressed.
Working with many stakeholders to revise language, we feel this proposal addresses those prior expressions.

The term “noncombustible material” is used many times within this code, is not consistently defined relative to other i-codes, and improperly includes requirements within a definition.

To address this, proposal G12-24 parts I-IV, seeks to address these issues by unifying to those of the requirements of International Building Code Section 703.3.

The International Building Code has criteria outlining what qualifies a material as noncombustible within the context of code, “noncombustible material” however is not defined within IBC, so performance requirements within IBC section 703.3 cannot be used in this code per IMC Section 201.3.

While IFGC and IMC currently do contain definitions for “noncombustible material”; both incorrectly mandate requirements within a definition and neither definition matches that of each other or of the IBC requirements in 703.3, which includes an additional test method ASTM E2652 and also makes exception for materials using surfacing not more than 0.125 inch with flame spread index less than 50.

This proposal is not defining requirements, it simply will guide users to what qualifies a material as noncombustible in context of the i-codes.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

It does not add or remove any requirements. It is clarifying to a user where to find the performance requirements.

Comment (CAH2)# 747

G12-24 Part V

IWUIC: SECTION 202

Proposed Change as Submitted

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Wildland Urban Interface Code

Revise as follows:

NONCOMBUSTIBLE MATERIAL. ~~As applied to building construction material means a material that, in the form in which it is used, is either one of the following:~~

A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the *International Building Code* are considered noncombustible materials.

~~1. Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E136 shall be considered noncombustible within the meaning of this section.~~

~~2. Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over 1/8 inch (3.2 mm) thick, which has a flame spread index of 50 or less. Flame spread index as used herein refers to a flame spread index obtained according to tests conducted as specified in ASTM E84 or UL 723.~~

~~"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classified as noncombustible that is subject to increase in combustibility or flame spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.~~

Reason: This proposal attempts to serve three purposes, all editorial and clarifying in nature:

1. Harmonize definitions found throughout multiple ICC codes (IBC, IRC, IFC, IWUIC, IMC, IFGC, IEBC)

2. Addresses the recent practice that ICC Codes Definitions should not contain requirements

3. Attempts to offer clarity between often-used, and often-confused terms used throughout ICC Codes: specifically, the difference between "Fire-Resistance Rating" (IFC, IBC, IWUIC) "Ignition-Resistant Building Material" (IWUIC), "Flame-Spread Index" (IBC, IRC, IFC, IWUIC, IMC), "Flammable Material" (IBC, IFC) , and "Noncombustible Material" (IRC, IWUIC, IMC, IFGC, IEBC)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal focusses on terminology harmonization, and does not add any requirements or change exiting requirements.

G12-24 Part V

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee stated that the reasons for the disapproval of the proposal were: The problem with the fact that there

was not information on the part of the definition that says in the form in which it is used and the other language in the definition that is being deleted. The reference to either 703.3 or 703.3.1 does reference an alternate reference standard which was not substantiated as noncombustible materials. (Vote: 13-0)

G12-24 Part V

Individual Consideration Agenda

Comment 1:

IWUIC: SECTION 202

Proponents: Alexander Haldeman, James Hardie Building Products, James Hardie Building Products (alex.haldeman@jameshardie.com) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Wildland Urban Interface Code

Delete and substitute as follows:

~~**NONCOMBUSTIBLE MATERIAL.**~~
~~A material that does not contribute appreciably to an ambient fire. Materials that comply with Section 703.3.1 of the *International Building Code* are considered noncombustible materials.~~

NONCOMBUSTIBLE MATERIAL.
See Section 503.2.1

Reason: Prior language suggested in the original proposal raised concerns from stakeholders. This proposal attempts to address prior concerns expressed while still making the code more user-friendly by providing guidance to users as to what qualifies a material as noncombustible in context of this code; which is acting as an overlay to other codes as set forth in section 501.1 and 501.2 (which is being updated/corrected per WUIC14 to include the *International Residential Code* and emphasizes that the provisions of this code shall apply).

The performance requirements of noncombustible material within the context of this code, as submitted in WUIC16-24 by FCAC and approved as modified, differ from that of IBC; it cannot be assumed a user of this code would be aware without being highlighted by italics via a definition within this code.

The original definition within WUI had requirements, contained language including the phrase “in the form in which it is used”, and also did not reference the alternate test method ASTM E2652. It is agreed that requirements should not be within definitions.; WUIC16-24, which was approved as modified in CAH1, both removes language from this code such as “in the form in which it is used” as it is implied and not used in other codes; and also adds reference to the alternate test method ASTM E2652, which is commonly accepted as an alternate test method provided the acceptance criteria of ASTM E136 are met.

This proposal is building upon both WUIC14-24 and WUIC16-24. This proposal is not defining requirements, it is a pointer guiding users to what is meant by the term within the context of this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is clarifying in nature and will not result in cost impacts.

Comment 2:

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com) requests Disapproved

Reason: Continue disapproving this proposal. The committee approved WUIC 16-24 as modified so that there is no definition of noncombustible in the IWUIC and this proposal would partially undo that action.

Cost Impact: No change to code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

G14-24

IBC: SECTION 202; IFC: SECTION 202

Proposed Change as Submitted

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org)

THIS CODE CHANGE WILL BE HEARD BY THE IBC EGRESS COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

Revise as follows:

[BE] SCISSOR STAIRWAY. ~~Two interlocking~~Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.

2024 International Fire Code

Revise as follows:

[BE] SCISSOR STAIRWAY. ~~Two interlocking~~ Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.

Reason: The term interlocking as defined in most dictionaries implies connection, and is defined as:

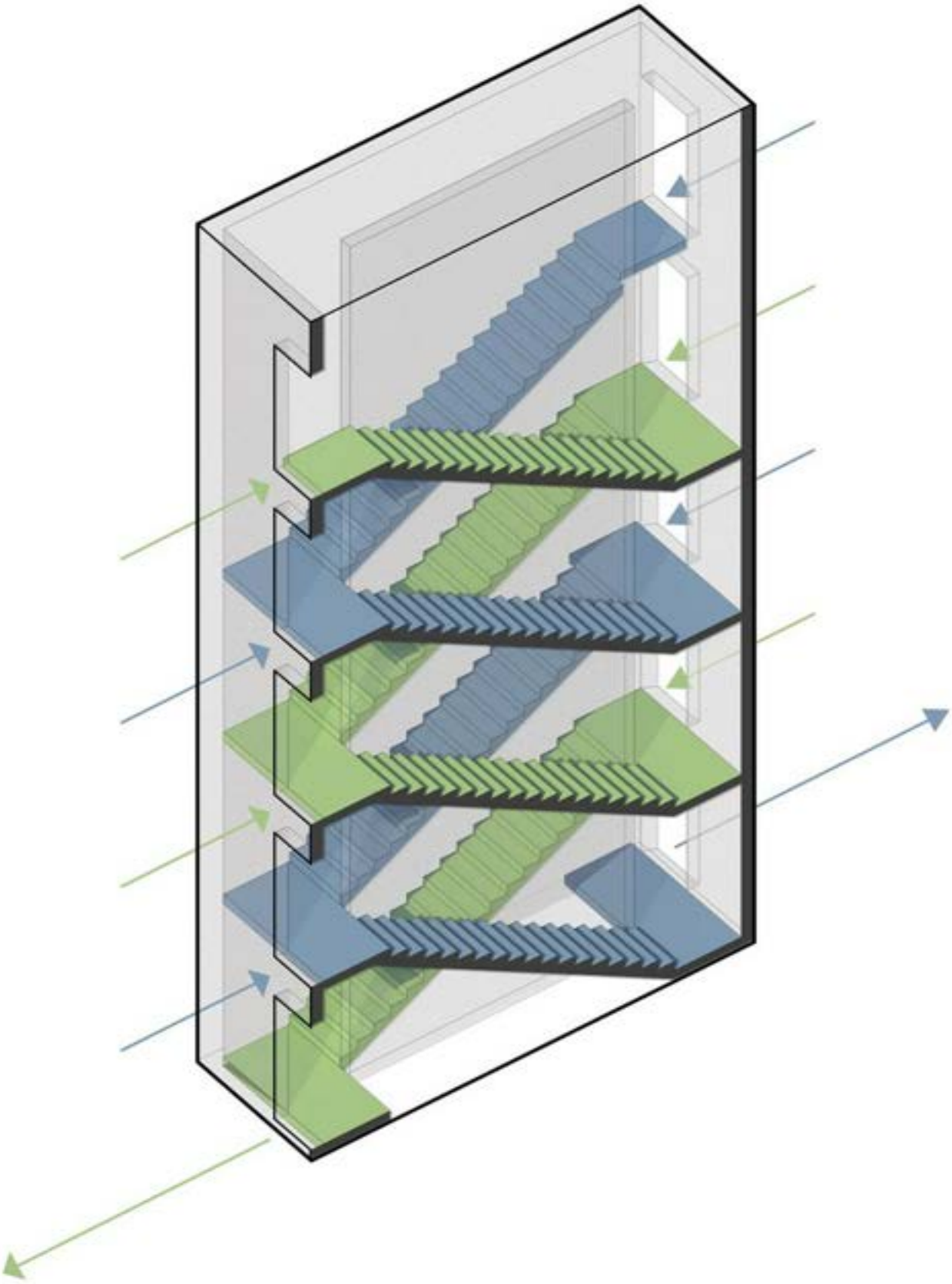
- Webster: 1. to lock together; join with one another. 2. to connect or be connected so that neither part can be operated independently.
- Merriam-Webster: 1. locked together. 2. to connect so that the motion or operation of any part is constrained by another.

A scissor stairway consists of separate stairways that are not connected. Each stairway serves the same function within a common enclosure, but they do so independently without constraining the other. Deleting the term interlocking and inserting independent offers a clearer description. The limit of "two" stairways is incorrect and must be deleted. Figure 1 shows an example of a scissor stairway with 8 stairways as the term stairway is defined in the IBC:

> **Stairway.** One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

Please support approval as submitted. This proposal offers clarification and will promote consistent interpretation.

Graphic courtesy of Chris Johns, ThoughtCraft Architects LLC



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal modifies the descriptive language by providing a more appropriate adjective, adds clarifying language and corrects the numerical error within the definition to align with the ICC defined terms used in the definition. It will have no impact on the cost of construction as it makes no technical changes relative to construction or the cost thereof.

G14-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee felt that the term "independent" would be confused stairways with two separate stairway enclosures. Another word such as "intertwined" might be clearer. Removing 'interlocking' should be coordinated with the text in Section 403.5.1 and 1007.1.1. (Vote: 10-4)

G14-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202, 1007.1.1, [BE] 403.5.1; IFC: SECTION 202, [BE] 1007.1.1

Proponents: David Cooper, Stair Manufacturing and Design Consultants, Stairbuilders and Manufacturers Association, SMA (coderep@stairways.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

Delete and substitute as follows:

~~**[BE] SCISSOR STAIRWAY.** Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.~~
[BE] SCISSOR STAIRWAY. Multiple *stairways*, located within a common exit enclosure, providing two or more paths of egress without fire separation between them.

1007.1.1 Two exits or exit access doorways. Where two *exits*, *exit access doorways*, *exit access stairways* or *ramps*, or any combination thereof, are required from any portion of the *exit access*, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the *building* or area to be served measured in a straight line between them. ~~Interlocking or *scissor*~~ *Scissor stairways* shall be counted as one *exit stairway*. **Exceptions:**

1. Where interior *exit stairways* or *ramps* are interconnected by a 1-hour fire-resistance-rated *corridor* conforming to the requirements of Section 1020, the required exit separation shall be measured along the shortest direct line of travel within the *corridor*.
2. Where a *building* is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

[BE] 403.5.1 Remoteness of interior exit stairways. Required *interior exit stairways* shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the *building* or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the enclosure surrounding the *interior exit stairways*. In *buildings* with three or more *interior exit stairways*, not fewer than two of the *interior exit stairways* shall comply with this section. ~~Interlocking or *scissor*~~ *Scissor stairways* shall be counted as one *interior exit stairway*.

2024 International Fire Code

Delete and substitute as follows:

~~**[BE] SCISSOR STAIRWAY.** Independent *stairways* located within a common exit enclosure, providing not less than two separate paths of egress located within one *exit* enclosure.~~
[BE] SCISSOR STAIRWAY. Multiple *stairways*, located within a common exit enclosure, poviding two or more paths of egress without fire separation between them.

[BE] 1007.1.1 Two exits or exit access doorways. Where two *exits*, *exit access doorways*, *exit access stairways* or *ramps*, or any combination thereof, are required from any portion of the *exit access*, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the *building* or area to be served measured in a straight line between them. ~~Interlocking or *scissor*~~ *Scissor stairways* shall be counted as one *exit stairway*. **Exceptions:**

1. Where *interior exit stairways* or *ramps* are interconnected by a 1-hour *fire-resistance-rated corridor* conforming to the requirements of Section 1020, the required exit separation shall be measured along the shortest direct line of travel within the *corridor*.
2. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

Reason: The related sections cited by the committee that regulate scissor stairs and include the term "interlocking" have been added to this change for the sole purpose of deleting the misused term "interlocking" which was the intent of the original proposal. Sections 1007.1.1 and 403.5.1 clearly indicate the restrictions or limits for the use of scissor stairways without the term "interlocking".

Other than the deletion of interlocking as originally reasoned, the changes in the definition provide clarity and are editorial in nature when compared to the current definition. The new definition reflects the committee's concern to assure the definition does not imply that the multiple paths of egress are separated but rather are within one enclosure. Scissor stairways as now defined will provide additional egress capacity without conflict with, and subject to, 1007.1.1, 403.5.1, and 403.5.2. The definition now addresses committee testimony and reason for their disapproval. It deletes "independent" and "separate" and provides a clear description.

If it is argued that the use of scissor stairs should or should not be restricted in certain applications then those changes need to be made elsewhere in the code. This definition eliminates confusing language and provides an accurate description as was the intent of the original proposal. Please approve as modified by this comment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal modifies the descriptive language by providing a more appropriate adjective, adds clarifying language and corrects the numerical error within the definition to align with the ICC defined terms used in the definition. It will have no impact on the cost of construction as it makes no technical changes relative to construction or the cost thereof.

Comment (CAH2)# 85

G26-24

IBC: [F] 427.2, [F] TABLE 427.2 (New)

Proposed Change as Submitted

Proponents: Richard Williams, Washington Association of Building Officials Technical Code Development Committee (richard@cwaconsultants.net); Micah Chappell, Seattle Department of Construction and Inspections, Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Quyen Thai, City of Tacoma, Washington Association of Building Officials Technical Code Development Committee (qthai@cityoftacoma.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 427
MEDICAL GAS SYSTEMS

Revise as follows:

[F] 427.2 Interior supply location. Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the ~~permitted amount~~ amounts specified per Table 427.2 are located inside ~~the~~ buildings, they shall be located in a 1-hour exterior room, 1-hour interior room or a *gas cabinet* in accordance with Section 427.2.1, 427.2.2 or 427.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Tables 307.1(1) and 307.1(2) shall be in accordance with Group H occupancies.

Add new text as follows:

[F] TABLE 427.2 PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lb)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lb)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount

Reason: The IBC commentary for Section 427.2 mentions IFC Section 105, which deals with permits for various materials. Without the commentary, it is not clear that IFC Section 105 applies in this case, because there is no mention of it in the body of the code section. Also, the IFC and the IMC both specifically state “**permit** amounts”, not “**permitted** amounts”. The word permitted in this context suggests an allowable amount, not an amount allowed by permit. It is also confusing because maximum allowable quantities are listed later in this section and also deal with allowable (permitted) amounts, but are referring to a completely different set of requirements - maximum allowable quantities for a control area.

The proposed change will bring over Table 105.5.9 from the IFC and will rename it Table 427.2. In our opinion it is cleaner to bring the table over rather than referencing individual sections in the IFC (Sections 105.5.9 and 105.6.3 both reference Table 105.5.9). This change will help to make clear when one-hour rooms (and sprinklers) or gas cabinets are required for medical gas installations.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not impact the cost of construction because it does not change existing requirements - it only attempts to clarify them. However, this clarification may in some cases result in situations where it is determined that fire rated construction, sprinklers and gas cabinets that would have previously been provided are no longer required.

G26-24

Public Hearing Results (CAH1)

Committee Action: **As Modified by Committee**

Committee Modification: Revise as follows:[F] TABLE 427.2 ~~PERMIT~~ AMOUNTS FOR COMPRESSED GASES

Committee Reason: This proposal was approved as it provides the necessary correlation in the IBC as to when these requirement apply. The modification simply removes the term "permit" from the title of the table. (Vote 9-4)

G26-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 427, [F] 427.1, [F] 427.2, [F] TABLE 427.2; IFC: SECTION 5306, 5306.1, 5306.2, TABLE 5306.2 (New)

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

SECTION 427
MEDICAL GAS SYSTEMS

[F] 427.1 General. Medical gases at health care-related *facilities* intended for patient or veterinary care shall comply with Sections 427.2 through 427.2.3 in addition to the requirements of Chapter 53 of the International Fire Code.

[F] 427.2 Interior supply location. Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Rooms containing medical gases shall be labeled in accordance with NFPA 99. Where containers of medical gases in quantities greater than the amounts specified per Table 427.2 are located inside buildings, they shall be located in a 1-hour exterior room, 1-hour interior room or a *gas cabinet* in accordance with Section 427.2.1, 427.2.2 or 427.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Tables 307.1(1) and 307.1(2) shall be in accordance with Group H occupancies.

[F] TABLE 427.2 AMOUNTS FOR COMPRESSED MEDICAL GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)

~~Carbon dioxide used in carbon dioxide enrichment systems~~	~~875 (100 lb)~~
~~Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications~~	~~875 (100 lb)~~
~~Corrosive~~	~~200~~
~~Flammable (except cryogenic fluids and liquefied petroleum gases)~~	~~200~~
~~Highly toxic~~	~~Any Amount~~
For hospitals, nursing homes and ambulatory care facilities	
Inert and simple asphyxiant	Comply with NFPA99
Oxidizing (including oxygen)	Comply with NFPA99
For health care-related facilities other than hospitals, nursing homes and ambulatory care facilities	
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
~~Pyrophoric~~	~~Any Amount~~
~~Toxic~~	~~Any Amount~~

2024 International Fire Code

SECTION 5306
MEDICAL GASES

5306.1 General. Medical gases at health care-related facilities intended for patient or veterinary care shall comply with Sections 5306.2 through 5306.5 in addition to other requirements of this chapter ~~and Section 427 of the International Building Code~~.

5306.2 Interior supply location. Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Rooms containing medical gases shall be labeled in accordance with NFPA 99. Where containers of medical gases in quantities greater than the ~~permitted amount~~ amounts specified per Table 5306.2 are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 5306.2.1, 5306.2.2 or 5306.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the *maximum allowable quantity per control area* as set forth in Section 5003.1 shall be in accordance with the *International Building Code* for high-hazard Group H occupancies.

Add new text as follows:

TABLE 5306.2 AMOUNTS FOR COMPRESSED MEDICAL GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
For hospitals, nursing homes and ambulatory care facilities	
Inert and simple asphyxiant	Comply with NFPA99
Oxidizing (including oxygen)	Comply with NFPA99
For health care-related facilities other than hospitals, nursing homes and ambulatory care facilities	
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504

Reason: IFC Table 105.5.9 is an operational permit levels for compressed gasses that are applicable to all occupancies.

IBC Section 427 is a copy of the first part of IFC Section 5306. Therefore the reference in IFC Section 5306.1 to IBC Section 427 is redundant.

IBC Section 427 and IFC Section 5306 are applicable to “medical gases in health care related facilities intended for patient or veterinary care.” Medical gasses are only two of the gasses listed in Table 105.5.9, so this complete table should not be listed. Having all the compressed gasses would be confusing. These two types of medical gases are listed in the new proposed table IBC Table 427.2 and IFC Table 5306.2.

For facilities covered under NFPA 99- hospitals, nursing homes and ambulatory care facilities – the table will coordinate with NFPA 99 requirements. Compliance is required for licensure for hospitals, nursing homes and ambulatory care facilities. NFPA 99 has different levels and similar room and cabinet protection requirements. The rest of the table is for other healthcare facilities addressed is this section such as doctor's offices, dentists and veterinarians.We feel that the this modification will address the proponent's concerns for clarifying limits for compressed gases. The reference to NFPA 99 will provide for a comparable level of protection in hospitals, nursing homes and ambulatory care facilities and will reduce conflicts between building code and licensure requirements that are expensive and often difficult for hospitals, nursing homes and ambulatory care facilities to address.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2024 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not impact the cost of construction because it does not change existing requirements - it only attempts to clarify them. However, this clarification may in some cases result in situations where it is determined that fire rated construction, sprinklers and gas cabinets that would have previously been provided are no longer required.

Comment (CAH2)# 247

G28-24

IBC: [P] 1210.2.2, [P] 1210.3, [P] 1210.3.1, [P] 1210.3.2, Chapter 35 IAPMO (New)

Proposed Change as Submitted

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

THIS CODE CHANGE WILL BE HEARD BY THE PLUMBING COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEES.

2024 International Building Code

SECTION 1210
TOILET AND BATHROOM REQUIREMENTS

Revise as follows:

[P] 1210.2.2 Walls and partitions. Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10. **Exception:** This section does not apply to the following *buildings* and spaces:

1. *Dwelling units* and *sleeping units*.
2. Toilet rooms that are not for use by the general public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

[P] 1210.3 Privacy. Public restrooms shall ~~be visually screened from outside entry or exit doorways to ensure user privacy within the restroom. This provision shall also apply where mirrors would compromise personal privacy. Privacy at~~ provide privacy for water closets and urinals ~~shall be provided~~ in accordance with Sections 1210.3.1 and 1210.3.2. ~~**Exception:** Visual screening shall not be required for single-occupant toilet rooms with a lockable door.~~

[P] 1210.3.1 Water closet compartment. Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Premanufactured partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B privacy requirements of IAPMO Z124.10. Premanufactured partitions for water closets located in all gender toilet rooms shall comply with the Type A privacy requirements of IAPMO Z124.10 or the water closet shall be located in separate room with a lockable door. **Exceptions:**

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in child day care *facilities* and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 occupancy housing areas.

[P] 1210.3.2 Urinal partitions. Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. Premanufactured partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C privacy requirements of IAPMO Z124.10. The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm). The walls ~~or partitions~~ shall ~~begin at a height not more than 12 inches (305 mm) from and~~ extend not less than 60 inches (1524 mm) above the finished floor surface. The walls ~~or partitions~~ shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in all gender toilet rooms shall be enclosed by premanufactured

partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the urinals shall be located in a separate room.

Exceptions:

1. Urinal partitions shall not be required in a single-occupant or family or assisted-use toilet room with a lockable door.
2. Toilet rooms located in child day care *facilities* and containing two or more urinals shall be permitted to have one urinal without partitions.

Add new text as follows:

IAPMO ANSI/CAN Z124.10-2022. Water Closets And Urinal Partitions

Reason: IAPMO Z124.10 is a new standard that regulates water closet and urinal partitions. The standard was published in 2022. The standard specified three different privacy ratings. In addition, there are tests for the quality of the partition. The tests include load, coating, surface examination, subsurface, colorfastness, stain resistance, wear and cleanability, chemical resistance, and stress test to name a few.

Type A privacy partitions are intended for all gender toilet rooms and provide the highest level of privacy. The standard states the following privacy requirements, “The bottom edge of the partition including the door shall be located less than or equal to 100 mm (4 in) off the finished floor. The top edge of the partition including the door shall be located greater than or equal to 2.13 m (84 in) above the finished floor. The full height of the door to the partitions on both sides shall prevent any visual observation from the outside of the partition enclosure. Doors shall be lockable from the inside of the partition enclosure. The door locking device shall be readily distinguishable as locked from the outside of the partition enclosure.” Furthermore, the standard requires a visual indication that the compartment is occupied when the partition door lock is activated.

Type B privacy partitions are standard water closet partitions found in separate gender toilet rooms. The standard states the following for privacy, “The bottom edge of the partition including the door shall be located within 406 mm (16 in) of the finished floor. The top edge of the partition including the door shall be located greater than or equal to 1.75 m (69 in) above the finished floor. The door to the partitions shall have a maximum of 13 mm (½ in) gap between the edge of the door and the wall of the partition. Doors shall be lockable from the inside of the partition enclosure.”

Type C privacy partitions are urinal partitions. The standard specifies the following requirements, “The bottom of the urinal partition shall be located a maximum of 406 mm (16 in) above the finished floor. The top of the urinal partition shall be a minimum of 1.5 m (60 in) above the finished floor. The urinal partition shall extend a minimum of 457 mm (18 in) from the wall.”

With the increase in the number of all gender toilet rooms, it is important to have proper privacy requirements to assure both privacy and security. This proposed change will require water closets and urinals in all gender toilet rooms to be enclosed in Type A privacy partitions or be located in a separate room. This will provide the highest level of privacy and security. Because of the added high level of privacy and security, the exception to Section 1210.3 becomes unnecessary. All of the privacy requirements are listed in the following two sections.

Type B privacy partitions are standard water closet partitions found in men’s and ladies’ rooms today. However, the gap between partition sections or between the door and frame have been reduced to ½ inch. Currently, there is no regulation on the gap in partitions nor are there any regulations for the quality of the partitions.

Type C privacy partitions are urinal partitions currently found in men’s rooms. Type C partitions are only intended for separate gender toilet rooms. In all gender toilet rooms, urinals are located similar to water closets to ensure privacy.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Estimated Immediate Cost Impact:

This change could increase the cost of construction $0.12 to $6.04 per partition, dependent on partition production volume. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. That cost may or may not be added to the cost of the product.

Estimated Immediate Cost Impact Justification (methodology and variables):

If a design professional intended to select a standard partition for an all gender toilet room, this change will increase the cost of construction by mandating a higher level of privacy and security. It should be noted that manufacturers are prohibited by Federal Law to discuss prices. That being stated, one can review the cost of listing a product on-line. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. In an attempt to find out the listing costs, one can check the ICC-ES website. The questions of what a cost of a listing is results in the following answer: Fees may vary. Contact us for a Statement of Work and/or an initial estimate. Similarly, IAPMO R&T does not publish fees. One can only request a quote for a listing. A Google search for the cost of a UL listing identified the cost as ranging between $5,000 and $50,000. Intertek advertises an annual listing fee of $6,040 for a single sanitary product, which is what a partition would likely be classified as. Hence, the exact dollar amount for a listing is unknown. That listing cost may or may not be added to the cost of the product. If it is added to the cost of the product, that additional cost will add to the cost of construction. However, manufacturers do not indicate if listing costs increase the cost of the product (construction). Hence, the impact is unknown. If one assumes the Intertek price for a listing and further assumes that the manufacturer sells 50,000 partitions a year, the increase cost of construction per partition could be assumed to be $0.12. If they only sell 1,000 partitions, the increased cost per partition would be $6.04.

Estimated Life Cycle Cost Impact:

Once installed, privacy partitions do not have any impact on life cycle costs.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Once installed, privacy partitions do not have any impact on life cycle costs.

G28-24

Public Hearing Results (CAH1)

Committee Action: **As Submitted**

Committee Reason: This proposal adds clarity for privacy of compartments in specific applications. (13-1)

G28-24

Individual Consideration Agenda

Comment 1:

IBC: [P] 1210.2.2

Proponents: Tim Earl, GBH International, Self (tearl@gbhint.com) requests As Modified by Committee (AMC2)

Modify as follows:

2024 International Building Code

[P] 1210.2.2 Walls and partitions. Walls and partitions within 2 feet (610 mm) of service sinks, urinals and water closets shall have a

smooth, hard, nonabsorbent surface, to a height of not less than 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10. High-density polyethylene (HDPE) and polypropylene (PP) partitions shall also comply with Section 803.9 of the *International Building Code*. **Exception:** This section does not apply to the following *buildings* and spaces:

1. *Dwelling units* and *sleeping units*.
2. Toilet rooms that are not for use by the general public and that have not more than one water closet.

Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

Reason: The reference to IAPMO Z124.10 will create ambiguity about the fire testing requirements, as the committee noted when disapproving P30, which would have added it to the IPC. This comment addresses that.
Section 803.9 of the IBC contains fire test requirements for HDPE and PP used as interior finish. Toilet room partitions are included in the IBC definition of interior finish. Therefore, they must comply with Section 803.9 of the IBC. The test referenced in 803.9 is necessary to obtain meaningful performance data from these materials, whose melting and dripping behavior can produce misleadingly positive results in other fire tests.
Since IAPMO Z124.10 contains a different fire test, users may erroneously believe that no other fire testing is required of partitions. The addition of this specific reference to 803.9 for HDPE and PP will ensure that the proper testing is not overlooked.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply a pointer to existing requirements.

Comment (CAH2)# 63

G29-24

IBC: [F] 3003.1.4

Proposed Change as Submitted

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org)

THIS CODE CHANGE WILL BE HEARD BY THE FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

2024 International Building Code

SECTION 3003
EMERGENCY OPERATIONS

Revise as follows:

[F] 3003.1.4 Temperature Control ~~Venting~~. Where standby power is connected to elevators~~, the machine room *ventilation* or air conditioning~~ and a temperature control means is provided per Section 3005.2, the temperature control means shall be connected to the standby power source.

Reason: To correlate the title and requirements with IBC Section 3005.2. The current titles and language are misleading because the real purpose is to provide standby power for the means to control the temperature for proper operation of the elevator equipment. This public comment to modify the proposal correlates with the public comment and proposal for IFC 604.3.4.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in the requirement for standby power, only a clarification to better align with another section in IBC.

G29-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: Disapproved based upon the action on F82-24. (Vote 14-0)

G29-24

Individual Consideration Agenda

Comment 1:

IBC: [F] 3003.1.4

Proponents: Kevin Brinkman, NEI, NEII (klbrinkman@neii.org) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Delete and substitute as follows:

~~**[F] 3003.1.4 Venting.** Where standby power is connected to elevators, the machine room *ventilation* or air conditioning shall be connected to the standby power source.~~

[F] 3003.1.4 Temperature Control. Where standby power is connected to elevators, the system for temperature control of spaces containing elevator equipment provided per Section 3005.2, shall be connected to the standby power source.

Reason: The requested changes are needed to correlate the title and requirements with IBC Section 3005.2 which was updated in the 2024 edition. “Temperature Control” more accurately describes the function and avoids confusion with “venting” which refers to the removal of smoke and gases during a fire. “Temperature Control” is used in other parts of the Code. Standby power is needed not just for cooling of the equipment to prevent overheating, but also to maintain the temperature in the appropriate range to ensure proper operation of the elevator. If the temperature in the equipment rooms and spaces is allowed to drop below acceptable levels, the elevator may not function properly. The alternate language addresses a comment from committee during CAH#1 to clarify that the standby power is any system provided to comply with 3005.2.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change is clarifying the requirement not changing it; therefore, there is no cost associated with the proposed change.

Comment (CAH2)# 483

S2-24

IBC: [BF] 1705.15, [BF] 1705.15.1, [BF] 1705.15.2, [BF] 1705.15.3, [BF] 1705.15.4, [BF] 1705.15.4.1, [BF] 1705.15.4.2, [BF] 1705.15.4.3, [BF] 1705.15.4.4, [BF] 1705.15.4.5, [BF] 1705.15.4.6, [BF] 1705.15.4.7, [BF] 1705.15.4.8, [BF] 1705.15.4.9, [BF] 1705.15.5, [BF] 1705.15.6, [BF] 1705.15.6.1, [BF] 1705.15.6.2, [BF] 1705.15.6.3, ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1705.15 Sprayed fire-resistive materials (SFRM). *Special inspections* and tests of *sprayed fire-resistive materials* (*SFRM*) applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.15.1 through 1705.15.6 and ASTM WK70851. *Special inspections* shall be based on the fire-resistance design. as designated in the *approved construction documents* The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed during construction with an additional visual inspection after the rough installation of electrical, *automatic sprinkler systems* , mechanical and plumbing systems and suspension systems for ceilings, and before concealment where applicable. The required sample size shall not exceed 110 percent of that specified by the referenced standards in Sections 1705.15.4.1 through 1705.15.4.9.

[BF] 1705.15.1 Physical and visual tests. The *special inspections* and tests shall include the following to demonstrate compliance with the listing and the *fire-resistance rating*:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kg/m^3).
4. Bond strength adhesion/cohesion.
5. Condition of finished application.

[BF] 1705.15.2 Structural member surface conditions. The surfaces shall be prepared in accordance with the *approved* fire-resistance design and the written instructions of *approved* manufacturers. The prepared surface of structural members to be sprayed shall be inspected by the *special inspector* before the application of the *SFRM* .

Revise as follows:

[BF] 1705.15.3 ~~Application~~ Substrate temperature verification and ventilation. The substrate shall have a minimum ambient temperature before and after application as specified in the written instructions of *approved* manufacturers. The area for application shall be ventilated during and after application as required by the written instructions of *approved* manufacturers.

[BF] 1705.15.4 Thickness. *SFRM* thickness shall be no less than allowed by ASTM E605. Not more than 10 percent of the thickness measurements of the *SFRM* applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the *approved* fire-resistance design, and none shall be less than the minimum allowable thickness required by Section 1705.15.4.1.

[BF] 1705.15.4.1 Minimum allowable thickness. For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM

E605. Samples of the *SFRM* shall be selected in accordance with Sections 1705.15.4.2 and 1705.15.4.3.

[BF] 1705.15.4.2 Floor, roof and wall assemblies. The thickness of the *SFRM* applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E605, making not less than four measurements for each 1,000 square feet (93 m^2) of the sprayed area, or portion thereof, in each *story*.

Revise as follows:

[BF] ~~1705.15.4.3 Cellular decks.~~ ~~Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. Not fewer than four measurements shall be made, located symmetrically within the square area.~~

[BF] ~~1705.15.4.4 Fluted decks.~~ ~~Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. Not fewer than four measurements shall be made, located symmetrically within the square area, including one each of the following: valley, crest and sides. The average of the measurements shall be reported.~~

[BF] 1705.15.4.5 Structural members. The thickness of the *SFRM* applied to structural members shall be determined in accordance with ASTM E605. Thickness testing shall be performed in accordance with acceptance criteria in ASTM E605, or on not less than 25 percent of the structural members on each floor, whichever is greater.

[BF] ~~1705.15.4.6 Beams and girders.~~ ~~At beams and girders thickness measurements shall be made at nine locations around the beam or girder at each end of a 12-inch (305-mm) length.~~

[BF] ~~1705.15.4.7 Joists and trusses.~~ ~~At joists and trusses, thickness measurements shall be made at seven locations around the joist or truss at each end of a 12-inch (305-mm) length.~~

[BF] ~~1705.15.4.8 Wide-flanged columns.~~ ~~At wide-flanged columns, thickness measurements shall be made at 12 locations around the column at each end of a 12-inch (305-mm) length.~~

[BF] 1705.15.4.9 Hollow structural section and pipe columns. At hollow structural section and pipe columns, thickness measurements shall be made at not fewer than four locations around the column at each end of a 12-inch (305 mm) length.

[BF] 1705.15.5 Density. The density of the *SFRM* shall be not less than the density specified in the *approved* fire-resistance design. Density of the *SFRM* shall be determined in accordance with ASTM E605. The test ~~samples~~ sample quantities for determining the density of the *SFRM* shall be selected as follows:

1. From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) or portion thereof of the sprayed area in each *story*.
2. From beams, girders, trusses and columns at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each *story*.

[BF] 1705.15.6 Bond strength. The cohesive/adhesive bond strength of the cured *SFRM* applied to floor, roof and wall assemblies and structural members shall be not less than 150 pounds per square foot (psf) (7.18 kN/m^2) for buildings with occupied floors up to 75' (22.86 m) above lowest fire department access. For buildings greater with occupied floors equal to or greater than 75' (22.86 m) above lowest fire department access shall be installed in accordance with bond strengths as listed in Table 403.2.3. The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E736 by testing in-place samples of the *SFRM* selected in accordance with Sections 1705.15.6.1 through 1705.15.6.3.

[BF] 1705.15.6.1 Floor, roof and wall assemblies. The test samples for determining the cohesive/adhesive bond strength of the *SFRM* shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m^2) of the sprayed area, or portion thereof, in each *story*.

[BF] 1705.15.6.2 Structural members. The test samples for determining the cohesive/adhesive bond strength of the *SFRM* shall be

selected from beams, girders, trusses, columns and other structural members at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m^2) of floor area or portion thereof in each *story* .

[BF] 1705.15.6.3 Primer, paint and encapsulant bond tests. Bond tests to qualify a primer, paint or encapsulant shall be conducted where the *SFRM* is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the *SFRM* has not been determined. A bonding agent approved by the *SFRM* manufacturer shall be applied to a primed, painted or encapsulated surface where the bond strengths are found to be less than required values.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70851 New Practice for Standard Practice for the On-Site Inspection of Installed Spray-Applied Fire Resistive Materials

Reason: This change deals with Spray Fire-Resistive Material installation special inspections. The proposal's purpose is threefold.

1. Introduce a new ASTM document to SFRM Special Inspection, WK70851 Practice for On-Site Inspection of Installed Spray Fire-Resistive Materials.
2. Clean up the language so that it speaks more inspection than application.
3. Eliminate duplications from IBC 1705.15 code sections and ASTM E605 and E736, standards. Where there was duplicate language from ASTM E605 or ASTM E736, the duplications were deleted from the code. Where the code acceptance criteria is more stringent than the inspection practices/standards, the code requirement language is retained.

The ICC Adhoc Committee on Terrorism Resistant Buildings (ICC TRB) added several items to this section to provide performance of installed SFRM fireproofing during the building life cycle. In preparing this proposal, we respected that legacy and left the increased inspection over and above the ASTM E605 and ASTM E736 alone.

In the interest of making this review easier, we kept several sections in the proposal that had no changes for easy reference and comparison of the code change to existing text. We have also highlighted below the changes and a short reason for each change.

- 1705.15 – Inserted new ASTM Work Item, practice for SFRM inspections on jobsites.
- 1705.15.1 – No change. It's important charging language.
- 1705.15.2 – No change.
- 1705.15.3 – Changed title from Application to Substrate temperature verification and ventilation, to reflect that the inspection standard is an inspection standard, not an application standard.
- 1705.15.4 – Thickness, added in the charging language that the inspection thicknesses are not less than what is in ASTM E605, and left the rest of the section alone, which is not in E605.
- 1705.15.4.1 – Minimum allowable thickness. No change, as the code is more restrictive than the E605.
- 1705.15.4.2 – No change, as the code is more restrictive than the E605.
- 1705.15.4.3 – Cellular decks, deleted, the section is duplicated in E605.
- 1705.15.4.4 – Fluted Decks, deleted, the section is duplicated in E605.
- 1705.15.4.5 – Structural Members – Slight change, that the measurement is to be in accordance with E605 or the code, whichever is greater. The code is more restrictive than the E605.
- 1705.15.4.6 – Beams and girders, deleted, duplicated in E605
- 1705.15.4.7 – Joists and trusses, deleted, duplicated in E605
- 1705.15.4.8 – Wide Flanged Columns - deleted, duplicated in E605…a wide flange column is a column, and all thicknesses for columns regardless of size are measured the same.
- 1705.15.4.9 – Hollow Structural section and pipe columns – not in E605, no change.
- 1705.15.5 – Density – slight edit, 'sample quantities', and left sample quantity at the more stringent code mandated amount.
- 1705.15.6 – Bond Strength – Added reference to table 403.2.3 for inspection, highlighting differences of bond strength for buildings between 0-74', 75'-420' and 420'+ in height. The bond strength issue was found by the ICC TRB to be a significant factor in SFRM being able to stay on substrates for the life of the building, hence the 430 PSF and 1,000 PSF that exists in the code today.

- 1705.15.6.1 – Floor, roof and wall assy. - No change, code more stringent than E736 standard.
- 1705.15.6.2 – Structural members - No change, code more stringent than E736 standard.
- 1705.15.6.3 – Primer, paint and encapsulant bond strength - No change, this section is not in E736.

As the ASTM SFRM inspection practice evolves and creates more duplications between the code and the standards, we'll propose more deletions at that time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not a change in requirements to SFRM Special Inspection procedures. The new WK 70851 Practice for the On-Site Inspection of Installed Spray Fire-Resistive Materials actually adds text making the administration of the inspection easier for jurisdictions.

The result of the code change should be that the inspection requirements are easier to handle for all involved, inspection agency, building official and contractors involved with inspections.

S2-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved as the proposed ASTM standard draft is not complete. The committee was glad to see the process has been started and recommends checking all new language. (Vote 11-1)

S2-24

Individual Consideration Agenda

Comment 1:

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us) requests As Submitted

Reason: The Fire Safety Committee Disapproved S2-24 because the ASTM Inspection Standard was not complete at the time of the hearings. We expect that this standard will be completed by the public comment hearing, or before. As soon as the ASTM Standard is complete, we will modify the proposal with the correct ASTM Standard number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 463

S4-24

IBC: 1705.17 (New), ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Add new text as follows:

1705.17 Board and Wrap Fire-Resistive Materials. *Special inspections* and tests for board and wrap fire-resistive materials applied to structural elements and decks shall be performed in accordance with ASTM WK70807. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents* and the manufacturers installation instructions. *Special inspections* and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70807	New Practice for the On-Site Inspection of Installed Board and Wrap Type Fireproofing

Reason: For decades, there has been special inspection for Spray Fire-Resistive Materials (SFRM) and Intumescent Fire-Resistive Materials (IFRM). However, board and wrap materials used for fireproofing structural building elements and assemblies have not been specifically named in their own section. The only place to find where special inspection for these materials might be is in section 1705.1 General. In 1705.1, General, it seems to assume that these items would get special inspections.

1705.1.1 Special cases. *Special inspections and tests shall be required for proposed work that is, in the opinion of the building official, unusual in its nature, such as, but not limited to, the following examples:*

1. Construction materials and systems that are alternatives to materials and systems prescribed by this

code.

2. Unusual design applications of materials described in this code.

3. Materials and systems required to be installed in accordance with additional manufacturer's instructions

that prescribe requirements not contained in this code or in standards referenced by this code

In section 1705.1.1(1) the IBC states 'alternatives to materials and systems prescribed in the code' should also get special inspections. Boards and wraps come in various types.

The board materials used can include gypsum panels, calcium silicate, mineral wool, composite metals with ceramic filling, or ceramic fiber type board protection. Wraps include ceramic fiber insulation, endothermic wraps. The common element of these is that they are installed in accordance with a listing and manufacturer's installation instructions to result in a fire-resistance-rated building element or assembly.

This new section is needed to assure fire-resistance and structural integrity is maintained during fire conditions regardless of material type.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is adding a standard practice to the code that regulates how the inspection is conducted - that is already done. Based on section 1705.1.1, Special Cases, the materials are alternatives to materials and systems prescribed in the code.

S4-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved, although they liked the idea of the proposal, they felt it has unintended consequences, is too broad, and needs to be cleaned up with more specific requirements. (Vote 12-0)

S4-24

Individual Consideration Agenda

Comment 1:

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us) requests As Submitted

Reason: The Fire Safety Committee Disapproved S4-24 because the new ASTM Inspection Standard was not complete at the time of the hearings. We expect that this standard will be completed by the public comment hearing, or before. As soon as the ASTM Standard is complete, we will modify the proposal with the correct ASTM Standard number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 465

S5-24

IBC: [BF] 1705.16, ASTM Chapter 35 (New)

Proposed Change as Submitted

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Revise as follows:

[BF] 1705.16 Intumescent fire-resistive materials. *Special inspections* and tests for *intumescent fire-resistive materials* applied to structural elements and decks shall be performed in accordance with ASTM WK70852 ~~AWCI 12-B~~. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents*. *Special inspections* and tests shall be performed during construction. Additional visual inspection shall be performed after the rough installation and, where applicable, prior to the concealment of electrical, automatic sprinkler, mechanical and plumbing systems.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

WK70852	New Practice for the On-Site Inspection of Installed Intumescent Fire Resistive Materials

Reason: For decades, there has been special inspection required in IBC's Chapter 17 for Intumescent Fire-Resistive Materials (IFRM). A new industry consensus standard is being balloted at E06 Main Committee, on its last few negatives. The consensus standard, ASTM, WK 70852, Practice for On-Site Inspection of Installed Intumescent Fire-Resistive Material, has been collaboratively developed with input from many stakeholders. When the standard is approved, we will submit a floor modification to insert the new standard number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change will have no effect on the cost of construction. The methods used are similar to what is currently written in the code.

S5-24

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved, and suggested the proposed ASTM standard needs to be complete (Vote 9-3)

S5-24

Individual Consideration Agenda

Comment 1:

Proponents: Bill McHugh, CM Services, National Fireproofing Contractors Association (bill@mc-hugh.us) requests As Submitted

Reason: The Fire Safety Committee Disapproved S5-24 because the ASTM Inspection Standard was not complete at the time of the hearings. We expect that this standard will be completed by the public comment hearing, or before. As soon as the ASTM Standard is complete, we will modify the proposal with the correct ASTM Standard number.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Comment (CAH2)# 467

S9-24

IBC: SECTION 202 (New), [BF] 2510.6, [BF] 2510.6.1, [BF] 2510.6.2, 2510.6.1 (New), 2510.6.2 (New), 2510.6.3 (New), TABLE 2510.6 (New)

Proposed Change as Submitted

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

THIS CODE CHANGE WILL BE HEARD BY THE IBC - FIRE SAFETY CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THAT COMMITTEE.

2024 International Building Code

Add new definition as follows:

STUCCO BOND BREAK. A substantially nonwater-absorbing layer placed directly behind stucco to prevent adhesion of the stucco to the surface of the *water-resistive barrier*, to serve as a protective layer over the *water-resistive barrier*, to provide a capillary break, and to promote drainage; examples include 10-min Grade D paper, No.15 felt, foam plastic insulating sheathing, polymeric building wraps, and other similar materials.

DRAINAGE PLANE. A continuous surface within a building assembly, such as created by a *water-resistive barrier* and flashing, installed in a manner that is capable of draining water by gravity flow downward and to the exterior.

DRAINAGE SPACE. A cavity in an *exterior wall* assembly, located between the *water-resistive barrier* and other exterior materials such as cladding or *stucco bond break*, used to enhance the drainage performance of the *drainage plane*.Examples include cavities formed by a furred gap, channels, a porous material or matrix, or other means to enhance drainage performance.

Revise as follows:

[BF] 2510.6 Water-resistive barriers. *A w*~~*W*~~*ater-resistive barrier*~~*s*~~,a *stucco bond break*, and a means of drainage shall be provided in accordance with one of the methods in Table 2510.6 or an *approved design* complying with Section 1402.2. ~~shall be installed as required in Section 1403.2 and shall comply with Section 2510.6.1 or 2510.6.2.~~ **Exception:** ~~Sections 2510.6.1 and 2510.6.2 shall not apply to c~~Construction where accumulation, condensation or freezing of moisture will not damage the materials.

Delete without substitution:

~~**[BF] 2510.6.1 Dry climates.** One of the following shall apply for dry (B) climate zones:~~

1. ~~The *water resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of *water resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the *water resistive barrier*, is directed between the layers.~~
2. ~~The *water resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water resistive barrier* complying with ASTM E2556, Type II. The *water resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater absorbing layer, or a drainage space or means of drainage complying with Section 2510.6.2. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water resistive barrier* shall be directed to the exterior side of the *water resistive barrier*.~~

~~**[BF] 2510.6.2 Moist or marine climates.** In moist (A) or marine (C) climate zones, *water resistive barrier* shall comply with one of the following:~~

~~1. In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material not less than 3/16 inch (4.8 mm) in depth shall be applied to the exterior side of the *water resistive barrier*.~~

~~2. In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.~~

Add new text as follows:

2510.6.1 Installation. The *water-resistive barrier* shall be installed in accordance with Section 1403.2. The *water-resistive barrier*, *stucco bond break*, and means of drainage as required by Table 2510.6 shall be installed such that a continuous *drainage plane* is maintained. Water shall be directed to the exterior at the base of the stucco application and at any transition between building stories or other conditions where the *drainage plane* or *drainage space* terminates.

2510.6.2 Combination of materials. Materials or systems that create a continuous plane and combine functions of *water-resistive barrier*, *stucco bond break*, or *drainage space* shall be permitted.

2510.6.3 Flashing. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, shall be directed to the *drainage plane* on the exterior side of the *water-resistive barrier*.

TABLE 2510.6 WATER-RESISTIVE BARRIER, STUCCO BOND BREAK, AND MEANS OF DRAINAGE FOR EXTERIOR PLASTER (STUCCO)

MOISTURE REGIME[a]	METHOD	WATER-RESISTIVE BARRIER (WRB)	STUCCO BOND BREAK (SBB)	MEANS OF DRAINAGE
Dry (B)	D1	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or any material meeting definition of a *stucco bond break*	*Drainage plane* is located between adjacent WRB and SBB layers.
	D2	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	*Drainage space* separating the layers not required
	D3		Not Required	*Drainage space* with means to separate stucco from direct contact with WRB
Moist (A) and Marine (C)[b]	M1	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or any material meeting definition of a *stucco bond break*	*Drainage space* with min 3/16-inch (4.6 mm) depth
	M2	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	
	M3		Not Required	*Drainage space* with min. 3/16-inch (4.6 mm) depth and means to separate stucco from direct contact with WRB
	M4	60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other nonwater-absorbing material meeting definition of a *stucco bond break*	Drainage plane or drainage space with drainage efficiency of at least 90% per ASTM E2273 or Annex A2 of ASTM E2925

a. The appropriate moisture regime shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code*.

b. Requirements for Moist (A) and Marine (C) moisture regimes shall be permitted to be applied in the Dry (B) moisture regime.

Reason: The previous two code cycles resulted in technical improvements to Section 2510.6 to address water management of conventional 3-coat stucco installations in moist (A) and marine (C) climate regimes. However, these changes brought about increased complexity of the provisions that vary based on wall assembly conditions and climate conditions with options and requirements that are cross-referenced between the two subsections (existing 2510.6.1 and 2510.6.2 shown as deleted). This formatting approach made determining a particular solution difficult and confusing. Therefore, this proposal clarifies the existing technical requirements and options by making them more “visual” in a table format without changing the technical intent of the code. The multiple requirements and inter-related options of Sections 2510.6.1 and 2510.6.2 (deleted) are now incorporated in Table 2510.6 in a straightforward manner. Also, new definitions for “STUCCO BOND BREAK”, “DRAINAGE PLANE”, and “DRAINAGE SPACE” are provided to facilitate clarity and accuracy in code reading and understanding of different components (and their functions) currently required for 3-coat stucco

applications but vaguely described within the code text. The drainage plane and drainage space definitions can also be used for other exterior wall covering applications in the code.

Beyond the overall formatting changes and definitions described above, some specific clarifications addressed by this proposal are as follows:

Section 2510.6 Water-resistive barriers.

New Table 2510.6 is referenced for requirements instead of the existing two subsections (proposed for deletion). The ability to use an approved design is also provided as a clarification that other solutions than identified in this section and Table 2510.6 are possible.

Section 2510.6.1 Installation. This new subsection consolidates installation requirements that were not addressed consistently across the existing code subsections 2510.6.1 and 2510.6.2. Also, a sentence is added to require drainage to the exterior at the base of the stucco application and at transitions between stories or other conditions where the drainage plane or drainage space terminates. This was based on stucco performance field research in Florida (see Bibliography).

Section 2510.6.2 Combination of Materials. This new subsection clarifies that materials which combine the required functions into a single product can be used rather than having to provide each of the required functions by separate materials. While this may be implied, the intent is to clarify it for transparency and to avoid different interpretations on this matter.

Section 2510.6.3 Flashing. This new subsection simply captures existing code content related to installation of flashing and its integration with the intended drainage plane.

Table 2510.6. This new table replaces the inter-twined and cross-referenced requirements of existing subsections 2510.6.1 and 2510.6.2 (shown as deleted). The requirements of these subsections are now mapped in Table 2510.6 as distinctly different solutions or methods for combining the various required components and options for those components (one combination of components is shown for each row of the table). Therefore, the user simply determines the correct climate “moisture regime” (see footnote a) and then selects an appropriate (or preferred) method and follows the required combination of components in that row of the table. This eliminates the need for a user to decipher the existing code text and cross-referenced requirements between different subsections of code to determine what is required. Finally, a footnote ‘b’ is added to the table to clarify that the more stringent moist/marine solutions can also be applied to the less stringent dry climate moisture regime (something the code inadvertently did not enable but which was intended to be permitted).

Bibliography: Lstiburek, J.W. (2005). Rainwater Management Performance of Newly Constructed Residential Building Enclosures During August and Septemeber 2004. Prepared for Home Builders Association of Metro Orlando and the Florida Home Builders Association by: Building Science Corporation, Westord, MA. January 11, 2005

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal strives to make no technical changes to the requirements in 2510.6 and focuses on formatting improvements and clarifications to better convey the various inter-related requirements and options in 2510.6 and particularly the cross-referenced requirements in subsections 2510.6.1 and 2510.6.2 for dry and moist/marine climates. The primary change is to reformat the subsections to address topics that apply regardless of the climate moisture regime and to place specific requirements and options (methods) in a table format where they can be easily visualized and selected without having to decipher the logic of the current code language.

Public Hearing Results (CAH1)

Committee Action: **Disapproved**

Committee Reason: The committee disapproved per the request of the proponent, to allow the proponents of S8 & S9 to reach an agreement for a coordinated table. (Vote 12-0)

S9-24

Individual Consideration Agenda

Comment 1:

IBC: SECTION 202 (New), 2510.6 (New), 2510.6.1 (New), 2510.6.2 (New), TABLE 2510.6 (New), [BF] 2510.6, [BF] 2510.6.1, [BF] 2510.6.2

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz) requests As Modified by Committee (AMC2)

Replace as follows:

2024 International Building Code

Add new definition as follows:

STUCCO BOND BREAK. A substantially nonwater-absorbing layer placed directly behind stucco to prevent adhesion of the stucco to the surface of the *water-resistive barrier.*

Add new text as follows:

2510.6 Weather protection. A *water-resistive barrier*, *stucco bond break*, means of drainage, and flashing shall be provided in accordance with Section 1402.2 and one of the methods in Table 2510.6. **Exceptions:**

1. The requirements for a means of drainage shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.
2. Masonry or concrete wall construction in accordance with exception 1 of Section 1402.2.
3. An *approved* design complying with exception 2 of Section 1402.2.

2510.6.1 Installation. The continuous *water-resistive barrier* shall be installed in accordance with Section 1403.2. The *water-resistive barrier*, *stucco bond break*, and means of drainage shall be installed in accordance with Table 2510.6. Water shall be directed to the exterior at the base of the stucco application and at any transition between building stories or other conditions where the means of drainage terminates.

2510.6.2 Flashing. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier.*

TABLE 2510.6 WEATHER PROTECTION REQUIREMENTS FOR EXTERIOR PLASTER (STUCCO)

Method	Moisture Regime[a]	Water-Resistive Barrier (WRB)	Stucco Bond Break (SBB)	Means of Drainage
1	Moist (A), Dry (B), or Marine (C) (any moisture	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	Drainage cavity with min. 3/16-inch (4.6 mm) depth between WRB and SBB layers
2		60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other *stucco bond break*	

3	regime)		Foam plastic insulating sheathing or other *stucco bond break*	Drainage between WRB and SBB layers with drainage efficiency of at least 90% per ASTM E2273 or Annex A2 of ASTM E2925
4	Dry (B)	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	Drainage is between WRB and SBB layers
5		60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other *stucco bond break*	
6			Not Required	Means of drainage in accordance with Method 1, 2, or 3 with means to separate stucco from direct contact with WRB

a. The appropriate moisture regime shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code* commercial or residential provisions.

Delete without substitution:

~~**[BF] 2510.6 Water-resistive barriers.** *Water-resistive barriers* shall be installed as required in Section 1403.2 and shall comply with Section 2510.6.1 or 2510.6.2. **Exception:** Sections 2510.6.1 and 2510.6.2 shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.~~

~~**[BF] 2510.6.1 Dry climates.** One of the following shall apply for dry (B) climate zones:~~

1. ~~The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier*, is directed between the layers.~~
2. ~~The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic insulating sheathing or other nonwater-absorbing layer, or a drainage space or means of drainage complying with Section 2510.6.2. Flashing installed in accordance with Section 1404.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier*.~~

~~**[BF] 2510.6.2 Moist or marine climates.** In moist (A) or marine (C) climate zones, *water-resistive barrier* shall comply with one of the following:~~

1. ~~In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material not less than $^{3}/_{16}$ inch (4.8 mm) in depth shall be applied to the exterior side of the *water-resistive barrier*.~~
2. ~~In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the *water-resistive barrier* shall have a minimum drainage efficiency of 90 percent as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.~~

Reason: At CAH1 the proponents of S8-24 and S9-24 requested disapproval to allow time to work with various stakeholders to resolve differences between the two similar proposals. The proponents and stakeholders have met and resolved those differences as represented in this replacement proposal for S9-24. The main goal of the proposal remains the same -- to clarify the current code requirements and clearly identify acceptable methods of installation for stucco applications on exterior walls. The proposal framework places the existing code requirements in a table format with listed methods that are appropriate for the respective climate regimes. The proposal also coordinates with requirements in Chapter 14 related to weather protection of exterior walls, including the exceptions provided in 2510.6.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is a reformat and clarification of existing requirements without impact to cost of construction.